

INQUIRY INTO SATELLITE AND MISSILE PROGRAMS

HEARINGS

BEFORE THE

PREPAREDNESS INVESTIGATING SUBCOMMITTEE

OF THE

COMMITTEE ON ARMED SERVICES

UNITED STATES SENATE

EIGHTY-FIFTH CONGRESS

FIRST AND SECOND SESSIONS

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INQUIRY INTO SATELLITE AND MISSILE PROGRAMS

MONDAY, NOVEMBER 25, 1957

UNITED STATES SENATE,
PREPAREDNESS INVESTIGATING SUBCOMMITTEE
OF THE COMMITTEE ON ARMED SERVICES,
Washington, D. C.

The subcommittee met, pursuant to call, at 10:05 a. m., in room 318, Senate Office Building, Senator Lyndon B. Johnson (chairman of the subcommittee) presiding.

Present: Senators Johnson (Texas), presiding, Kefauver, Stennis, Symington, Saltonstall, and Flanders.

Also present: Senators Smith (Maine), Case (South Dakota), Barrett, and Bush, members of the Committee on Armed Services; Senators Carroll and Dirksen;

Edwin L. Weisl, special counsel; Cyrus R. Vance, associate counsel; Gerald W. Siegel, associate counsel; Solis Horwitz, associate counsel Daniel F. McGillicuddy, Jr., associate counsel; Stuart P. French, associate counsel; George Bunn, associate counsel; Edwin L. Weisl, Jr., assistant special counsel; William V. Houston, consultant, and Dr. Homer J. Stewart, consultant;

Dr. Edward C. Welsh, assistant to Senator Symington.

Senator JOHNSON. Please come to order.

First, I want to welcome the members of the Armed Services Committee to this meeting of the Preparedness Subcommittee of the Armed Services Committee.

The Preparedness Subcommittee is made up of seven members: Senator Johnson of Texas, Senator Kefauver, Senator Stennis, Senator Symington, Senator Bridges, Senator Saltonstall, and Senator Flanders.

Each member of the Armed Services Committee is an ex officio member of the Preparedness Subcommittee. That subcommittee was set up in 1950, and has been operating under authorization of the Senate since that time.

We particularly welcome Senator Smith and Senator Bush, Senator Barrett, and Senator Case, to our deliberations. And when the questioning begins, the committee has decided that we will follow this procedure: The members will question witnesses in order of their seniority, whether they are members of the subcommittee or of the full committee.

We are delighted that you could be here with us, and we hope that you can attend most of our sessions.

We are here today to inquire into the facts on the state of the Nation's security. Our country is disturbed over the tremendous military and scientific achievement of Russia. Our people have believed that in the field of scientific weapons and in technology and science, that we were well ahead of Russia.

With the launching of Sputniks I and II, and with the information at hand of Russia's strength, our supremacy and even our equality has been challenged. We must meet this challenge quickly and effectively in all its aspects.

Members of the Preparedness Subcommittee's staff began to assemble information within hours after the first satellite was announced, in order to be ready for this hearing.

On November 4, the chairman and the ranking minority member, Mr. Bridges, of the Senate Armed Services Committee, and the chairman of the Preparedness Subcommittee, were briefed at the Pentagon.

The facts which were brought before us during that briefing gave us no comfort. It was decided on the following day that there should be a full, complete, and exhaustive inquiry into the state of our defenses and the steps that would have to be taken.

To direct that inquiry, we secured the services of an eminent and distinguished attorney, Edwin L. Weisl, of New York City. With other members of the committee staff, Mr. Weisl has interviewed many people under the direction of the committee.

The witnesses who will appear today were selected as a result of those interviews.

It is the consensus of the scientific community that these witnesses are extremely well qualified to present the physical facts of the situation with which we are confronted.

We are particularly pleased to have as consultants to this committee Dr. William Houston, president of Rice Institute at Houston, Tex., and Dr. Homer J. Stewart, of California, of Cal Tech.

We have decided to begin the hearings with scientific witnesses because we felt that our people should know exactly what we are talking about.

The newspapers have been filled with columns about satellites and guided missiles, but nowhere is there a record that brings together in one place precisely what these things are and exactly what they mean to us.

We hope to produce that kind of record today.

We hope that when the testimony is finished, we will have a clear definition of the present threat to our security, perhaps the greatest that our country has ever known. When we conclude with the scientific witnesses, we will examine the known information on Soviet and American capabilities. This testimony will necessarily be highly classified.

There are a few things I wish to make clear about the committee's attitude.

It would appear that we have slipped dangerously behind the Soviet Union in some very important fields. But the committee is not rendering any final judgments in advance of the evidence, on why we slipped or what should be done about it.

Our goal is to find out what is to be done. We will not reach that goal by wandering up any blind alleys of partisanship.

I suppose that all of us, being human, have some ideas on steps that should be taken. But the committee judgment will represent a meeting of the minds after all the facts are available, and this committee's judgment will represent an effort to make a contribution to the defense of our Nation.

The facts that I learned so far give me no cause for comfort. I do not feel that they must be withheld from the public. I feel that we need observe only the requirements of security, and these are requirements upon which sensible men can always agree.

It is not necessary to hold these hearings to determine that we have lost an important battle in technology. That has been demonstrated by the satellites that are whistling above our heads.

But to me, and I think to every other American, a lost battle is not a defeat. It is, instead, a challenge, a call for America to respond with the best that is within them.

There were no Republicans or Democrats in this country the day after Pearl Harbor. There were no isolationists or internationalists. And, above all, there were no defeatists of any stripe.

There were just Americans anxious to roll up their sleeves to close ranks and to wade into the enemy.

One of the witnesses, yesterday, compared the present situation to the challenge that faced America after Pearl Harbor. In some respects, I think it is an even greater challenge. In my opinion, we do not have as much time as we had after Pearl Harbor.

But we do have time, and we do have determination, and we do have willpower. I do not believe the facts will invite our people either to a siesta or to a hysteria. I believe the facts will inspire Americans to the greatest effort in American history.

And this committee seeks only to determine what can be done, what should be done, what must be done now and for the long pull.

The American people have the capacity to do it, and we are confident that they will do it.

Our first witness this morning is Dr. Edward Teller, one of our most most eminent physicists. For the benefit of the record, I would like to state some biographical data concerning Dr. Teller's qualifications.

Dr. Teller, who is generally known as the father of the H-bomb, is a professor of physics at the University of California Radiation Laboratory.

He was born in Budapest, Hungary, in 1908, and he was educated in Germany. In 1935 Dr. Teller came to the United States to accept the position as professor of physics at George Washington University.

He left this post in 1941 to join the staff of the Institute for Nuclear Studies at the University of Chicago. He served as a professor of physics at the University of Chicago from 1946 to 1949, and again from 1951 to 1953. In between these assignments, he was a staff member of the Los Alamos Scientific Laboratory in New Mexico.

He has been associated with the University of California Radiation Laboratory since 1952.

Dr. Teller, the members of this committee welcome you to this hearing. We are all familiar with the outstanding service that you have rendered this country in the field of nuclear energy and the field of basic research. We are eagerly looking forward to your testimony.

And now, in accordance with the rules of the committee, Dr. Teller, will you please rise, raise your hand, and take the oath.

Do you solemnly swear that the testimony you will give this committee will be the whole truth, and nothing but the truth?

Dr. TELLER. I do.

Senator JOHNSON. Be seated.

TESTIMONY OF DR. EDWARD TELLER

Senator JOHNSON. Now, Mr. Weisl, committee counsel, will you proceed with the witness?

Mr. WEISL. Yes, sir.

Dr. Teller, we realize that you have traveled night and day by air to get here for this hearing. And we also know that you have been working intensively at Los Alamos and the University of California Radiation Laboratory, in the interests of our Nation's security.

I am also aware of the fact that you are not well, and therefore if in the course of this examination you feel that you need a respite, I am sure the chairman will grant you a small recess.

Dr. TELLER. Thank you very much.

Mr. WEISL. Will you please tell us, Dr. Teller, briefly, what your relationship to atomic and thermonuclear weapons has been since your arrival in this country?

RELATIONSHIP WITH ATOMIC WEAPONS AND THERMONUCLEAR BOMBS

Dr. TELLER. Well, I arrived in this country in 1935. And at that time, of course, none of us dreamt of any such thing as a nuclear weapon. A short time after that, at the George Washington University here in town, working with my good friend, George Gamow, we discussed the energy sources of stars; and in connection with that we got interested in reactions between nuclei and we learned some apparently impractical facts which happened to be useful later.

The topic became really exciting at the end of 1938—January 1939 when we heard about the discovery of fission, and then I was gradually driven into the orbit of the Manhattan District. I worked first in Washington informally, then at Columbia University, then a little later and in a formal sense in the metallurgical laboratory in Chicago which was then the code name for our work on nuclear energy, and in the end during the war in Los Alamos.

At that time I was a little bit more concerned with advanced plans, and in this way I got very much interested—in fact from the very beginning, not only in fission, in the fission process but in the thermonuclear processes as well.

Then in 1949, after I had gotten back to Chicago, I decided to spend a little bit more time in Los Alamos where I had very many friends and where I felt the work is becoming more and more important. And then shortly after I got to Los Alamos, the Russians fired their first nuclear explosion, detected in this country; and at that time some of us, and I also, felt that this is the time to go ahead with some of the old plans which we had already formulated, and in this way we got into the work on thermonuclear reactions, on the hydrogen bomb, on which we were quite intensively working and which was then carried out in Los Alamos in a very brilliant way.

I went back from there to Chicago, but shortly after that, a second weapons laboratory had been organized in Livermore at the University of California. I had been invited to join that, and I felt at the time it was important that this country should have two independent laboratories, in spite of the fact that Los Alamos is so excellent. I think that both laboratories are working now in a most excellent fashion. And as I say, I was asked to join, and once I got into California, I found it hard to leave it again and I am still there.

Mr. WEISL. Have you participated very actively in the development of the hydrogen bomb?

Dr. TELLER. I have, yes, sir.

Senator JOHNSON. Could I interrupt a minute. Senator Symington is having trouble seeing the witness because of the photographers, and we have had a request to ask them to take their pictures and then move along.

Senator SYMINGTON. Mr. Chairman, if I may say so, my interest is more in the witness than it is in the photographers. If the witness is satisfied——

Senator JOHNSON. We cleared that with Dr. Teller, and it was agreeable to him to have the pictures made by them.

Senator SYMINGTON. I will not in any way, Mr. Chairman, object to the photographers if they do not bother the witness.

Senator JOHNSON. I understood from the counsel they were bothering you.

Senator SYMINGTON. I think the witness and counsel misunderstood me.

Dr. TELLER. I would like to say the picture taking is not bothering me, but indeed I would be a little bit more comfortable if I could talk directly to you without going over the head of the photographers.

Could you take the pictures from the side so it would be more private.

Senator JOHNSON. Would the photographers take official notice of that request, and after you have taken your pictures, move over to the side so as not to obstruct the Senators. Get your pictures as soon as you can and let us proceed with the hearing, please.

FISSIONABLE AND THERMONUCLEAR MATERIAL AND LONG-RANGE AND INTERMEDIATE MISSILES

Mr. WEISL. Dr. Teller, will you please tell the committee the relationship between fissionable and thermonuclear material and the long-range and intermediate missiles?

Dr. TELLER. An intermediate missile, of course, is a missile with quite a long range. I think everybody knows today that an intermediate missile is one that is fired perhaps at a distance of 1,500 miles; and an intercontinental or really long-range missile is one that is fired at a distance of 5,000 miles or so. And furthermore, the names of these instruments, ballistic missiles, means that they are sent out, put on a course, and after that, they just hit what they do hit. And you have to try to put them on course rather accurately to begin with.

Now, to hit within a few feet when you have started from 5,000 miles or even from 1,500 miles is, of course, something which is actually impossible. And if you should shoot at such great distances, then you are not going to hit your target very accurately. Therefore, it is quite important for these long-range missiles to be armed with explosives which themselves have quite a range of effectiveness. And therefore, the more powerful explosives we have, the more practical these missiles become.

WARHEADS

At the same time, of course, it is no small thing to shoot over such long distances. A great deal of power is required and again, there-

fore, the lighter we can make these explosives or these warheads, the easier is the job of the missile man. Therefore, there is indeed very close connection between the two fields, if that may be a sufficient answer.

Mr. WEISL. In other words, without the warhead and the explosive power in the warhead, the long-range missile would not be very useful?

Dr. TELLER. As far as we see now, and as far as I can imagine, this is so.

Mr. WEISL. When did you discover, or when did you and your associates discover, that you could reasonably expect to have a powerful explosive warhead that would suit a long-range missile?

Dr. TELLER. I would, in a way, like to ask not to answer this question in this form for several reasons. But the most strong, the strongest reason is that such a discovery, such a realization, does not come all in one piece. It gradually grows on one. And let us say in 1945 I had an opinion on the subject, and in 1955 I had a different opinion on the subject. And in the meantime, our opinions changed, and how each change has occurred would be a long story.

But I would say this: that the development of the missiles has in actual fact, and at least to a very great extent, waited for the realization of a warhead. We did not go ahead and undertake a very vigorous program to developing long-range missiles before the time at which it was reasonably clear that a warhead was available. And by that time, I should say, it was practically too late. We had waited too long to reach this decision.

SOVIET PROGRESS

Mr. WEISL. As we get into the subject of the Russian development, you will testify as to what the Russians did in that respect.

In connection with the development of the thermonuclear explosive material, the question of dangerous fallout has been in the public's mind. Have you done any work, or have you and your associates done any work, to effect as nearly as possible a "clean" bomb?

Dr. TELLER. There has been quite a bit of work on the subject. I should like to say that initiative for the work of such a clean bomb has come from the Atomic Energy Commission itself, particularly from Commissioner Libby. Under his suggestion, we have started to work on this subject and in the laboratories this is now being pushed with very great vigor. For some types of bombs, we have developed clean types which are already quite effective in the sense that they cut out 95 percent of the radioactive dangerous substances.

This unfortunately does not apply to all types of bombs, and we are trying to apply these principles universally and trying to make the bombs as clean as we possibly can. This is a long-range development. And I think in the long run it may lead, I think it will lead, to the peaceful applications of nuclear explosives, because the moment you can make these bombs clean, you can just use them as more powerful explosives, and it is probably known to you that more high explosives have been used in peacetime than wartime.

Mr. WEISL. In what respect?

Dr. TELLER. Well, in engineering projects, in mining projects.

Mr. WEISL. In order to carry on experiments looking toward the perfection of a clean bomb, so to speak, you must have testing?

Dr. TELLER. It is absolutely necessary to have testing. You cannot hop along on one theoretical leg just as you cannot go along on the other purely experimental leg. You have got to get your ideas straight and then go out in the field and see how they work out.

SATELLITE MILITARY AND SCIENTIFIC SIGNIFICANCE

Mr. WEISL. Dr. Teller, the people of the United States were taken by surprise when they discovered that the Russians were able to launch a sputnik or a satellite into outer space and put it in orbit. Does the launching of such a satellite in outer space have any military and scientific significance?

Dr. TELLER. It has great military significance, because, among other things, it shows that the Russians are far along, very far along, in rocket development. But it has also some intrinsic military significance. In addition, it aids in all kinds of scientific developments because it allows us to find out a great number of things about outer space, and, looking back on earth, some of the properties of our own globe. It has great significance in both these directions.

Mr. WEISL. Would you like to discuss this scientific and military significance of the satellite at this time or would you like to wait until we get into the long-range planning that is necessary to meet the Russian threat?

Dr. TELLER. Whichever way you say, but it seems to me that if we can get back to long-range questions later, then at least the scientific significance of sputnik might be very well delayed until we get into long-range questions and perhaps after we have discussed what to do right away.

Mr. WEISL. Very well.

SOVIET PROGRESS IN SATELLITE LAUNCHING

Dr. Teller, in order to launch this satellite into outer space and put it in orbit, what did the Russians have to have in order to accomplish this feat?

Dr. TELLER. They have to have a very powerful rocket motor. To put up half a ton of material a thousand miles from the earth is a very respectable achievement, and this rocket motor is, of course, one of the main things that one needs in launching an intercontinental ballistic missile as well.

In addition, what they need is some sort of a guidance system. Now, to put a satellite into an orbit, into a reasonably well-defined orbit, does not need as fine a guidance as you need if you want to hit a target at a great distance, but it needs a reasonably advanced type of guidance, and therefore the things needed for the satellite are quite close to the requirements for intercontinental ballistic missiles as well.

Senator JOHNSON. Could we ask the photographers to please leave the front of the table?

Proceed, counsel.

Mr. WEISL. Dr. Teller, does it also indicate that they have a form of propulsion, either solid or liquid, that is necessary to launch this heavy satellite?

Dr. TELLER. It certainly means that. That is just proven by the fact of the satellite clearly. Of course, we do not have a direct and complete proof that Sputnik II indeed was half a ton. What little I could find out from our own observation is in agreement with this claim, and the Russian claims in this general direction have proved so far correct, and I think it would be a great mistake to proceed under the assumption that they are only bluffing.

Mr. WEISL. Then you believe that the Russians have an intercontinental ballistic missile at this time?

Dr. TELLER. Well, I certainly do not know, I cannot say it with complete certainty, but I would like to say this: They have said that they have the weapon. There is every reason to believe that they have it at least in the stage where they have constructed it and tested it. As to what extent they have numbers of them, to what extent they have the operational capability, of that I have no knowledge whatsoever, and I hope that as yet they do not have such an operational capability.

Mr. WEISL. Dr. Teller, in the Friday edition of the New York Times a report stated that your colleague, Dr. Ernest Lawrence, who is a Nobel Prize winner and one of the great contributors to our nuclear development, stated that the launching of a heavy satellite by Russia indicated to him they had an intercontinental ballistic missile that could pinpoint or hit Houston, Tex.

Do you believe that that is a fair inference to be drawn from the launching of the satellite?

Dr. TELLER. Yes, sir. I would perhaps elaborate on it in this way.

Mr. WEISL. Please do.

Dr. TELLER. I am not considering either Houston, Tex., or the area that a satellite affects precisely as a pinpoint.

Mr. WEISL. He happened to be speaking in Houston at the time, and that is why he used the example of Houston, Tex.

Dr. TELLER. But I would like to say this: I do not think that we know enough about the Russian guidance system to be able to say so with definiteness; at least, I do not know enough to be able to say with definiteness that they have the required accuracy at the present moment. However, if you just consider the kind of difficulties which such a system has, and if they have done what they have accomplished to date, then either they have the ability to hit Houston, Tex., now, or they will have this ability in a rather short time. And, certainly, the possibility that this will happen we shall disregard at our greatest peril.

Mr. WEISL. Dr. Teller, what must the Russians have in their long-range guided missile, in addition to their ability to put a satellite in outer space, in order to hit a target?

Dr. TELLER. They must have a better guidance system. I do not mean better, compared to what they have now, because I do not know what they have now, so I cannot make a comparison. But in order to hit a target, they have to have a better guidance system than they must have in order to put something into a satellite orbit. And secondly, they have to solve the problem of reentry of the satellite into the atmosphere.

MISSILE REENTRY

Mr. WEISL. You might explain—excuse me.

Dr. TELLER. You see, when the missile is shot out, it is being accelerated and acceleration is continued outside the atmosphere. Therefore, when the missile is on its way up, it still goes relatively slowly, although, in fact, it goes fast enough; but on the way back the missile comes in at full speed, and then unless you are careful what you do the first contact with atmosphere will destroy the missile.

Now, this problem of reentry is a problem which is not too easy, but also it is one which I think is solvable and I have no doubt that both ourselves and the Russians can solve it.

What we have done in the field, I cannot say for two reasons. One is that I do not know sufficiently the details, and, second, the details are classified. What the Russians have done in this field, I just simply do not know. But I am sure that it is a solvable problem, and for all I know, they may have solved it already.

Mr. WEISL. Do you believe it is safe and reasonable for us to assume that they have solved it?

Dr. TELLER. It is safe and reasonable to assume that; yes, sir.

WHY WE ARE BEHIND RUSSIANS

Mr. WEISL. Dr. Teller, why do you believe we are behind the Russians in the development of the long-range missile?

Dr. TELLER. That is something of a long story; and may I take the patience of the committee to answer it in more than just a few words?

Senator JOHNSON. Yes.

Dr. TELLER. I would like to say that there is a special reason, and there is a general reason.

The special reason I have already tried to indicate. The special reason is that we have not embarked on a really vigorous missile program before we had clear and definite evidence what we shall do with such a missile, how such a missile can be used.

Let me make this a little bit more complete. In 1946, right after the end of the war, we could have said: Let us develop ballistic missiles. One can go big distances, they are extremely interesting developments, some important wartime usefulness has been demonstrated by the German V-2.

Well, we did go into the development of ballistic missiles, but at an exceedingly slow and small rate. We did not start a vigorous development because it could not be proved that these missiles will be really important in the next war. We did not, if the next war comes, we did not have the really powerful explosive that would be needed in the warhead of such a missile.

Years later we finally realized that a system consisting of a guided missile and a warhead, which in the meantime has been developed, would indeed be an extremely powerful weapon. Therefore, we have determined to start a very vigorous program on the ballistic missile.

When we started this program, we went into it with quite a bit of energy and I think the efforts have paid off, and I have nothing to say about that program that would not bear out that it has been an excellent and excellently managed program, but it came too late.

The Russians have started on their ballistic-missile program, from all we know, right after the war, and they kept at it. Why they did it? Well, I think there are two reasons: One very obvious reason is that they are interested in closer targets than we are and therefore the missile made sense to them at an earlier time.

But I think that we have evidence that the Russians are willing to take greater gambles in their development program than we are, and this is an important general point which I would like to explain.

There is excellent work in this country on the kind of investigation which one man or a few people can do. We do good work, both in pure science and in the investigation of applied possibilities as long as such investigation does not cost too much. Also, we have done reasonably well in big projects where we know precisely where we are going, where we know that there is a payoff, and we have shown frequently in the past that we can spend a billion dollars or billions of dollars if it is really necessary.

EXPENDITURES

But there is one area in which we are not doing so well. When it comes to spending \$10 million or \$50 million to begin to develop an area about which we do not yet know for certain that it will pay off, but about which there is a reasonable presumption that somehow or other it is going to pay off, in this intermediate range of practical research, we have been rather poor. Really substantial amounts of money are not available unless we can prove in black and white that it is something that is absolutely necessary. We are not taking the kind of risks which in war, in cold war as well as in hot war, one necessarily has to take. And we have plenty of evidence that the Russians have taken that kind of risk.

Now, I would like to say one last word. The ballistic-missile race in which we very clearly appear to be not in the lead, where the Russians are ahead of us, is only one special case, and the trouble is a more general one.

NUCLEAR WEAPONS

At the end of the war, we had a monopoly on nuclear weapons, a monopoly on nuclear energy. The Russians, if I estimate the situation correctly, have not caught up with us, but they have closed the gap in an alarming fashion. In airplane construction, they were just nowhere at the end of the war. Today, I am again not the expert to argue whether they are behind us or whether they are ahead of us, but certainly what they do is fully comparable to what we are doing.

In ballistic missiles, they are, I think, according to all the simple evidence that one can see, ahead of us. In radar, we had a most impressive lead. I doubt very much that we have this lead now. We may have lost it or not, I do not know the details. There is no doubt that since the end of the war the Russians have worked at a much faster rate; much more effectively in all fields of application of technology to the advanced military systems, and if the relative efforts continue, as they have been since the war, there is no doubt that in a few more years the Russians will leave us behind and way behind.

WHAT THE UNITED STATES SHOULD BE DOING

Mr. WEISL. Dr. Teller, looking again at the immediate danger and the short-range program, have you any opinion as to what the United States should be doing now to meet the danger?

Dr. TELLER. Well, I would say that the immediate danger very obviously is in the missile field.

As I have said, we have a very healthy missile program, and we had it for a few years.

First of all, I would like to say what I would not do. I think that I would not recommend to embark on a rapid reorganization of the effort. This could rock the boat so that our effort might actually be retarded rather than advanced.

At the same time, I would say that I am sure that the effort, which is an excellent effort as it stands today, is not good enough. I am quite sure that once an emergency has become clear to the American people, as this emergency has become clear, there are ways and means by which further acceleration is possible.

One very important thing will be that we must be generous with money, and that we must apply more money to the program in any place where it can be applied in an effective manner, and there are many such places.

May I please ask permission to answer this question a little bit more explicitly, but in an oblique manner?

My main field is not that of missiles. If you ask me too closely how to accelerate the missile program, I will honestly have to answer "I do not know." My specialty is nuclear weapons.

LOS ALAMOS

I have just returned from a trip to Los Alamos, where I had worked, where I have many friends, and where I am not working now, but I was there on a visit, on an official visit.

Now, I wondered whether I can use the Los Alamos situation, what I have just seen there in the past few days, to illustrate what I mean, even though it is not squarely in the line of your investigation. Is that permissible?

Senator JOHNSON. Yes. Go ahead.

Dr. TELLER. I would like to say this: In Los Alamos you have a group of really good experts who are working in a field in which we are still in the lead, but in which we may be losing the lead if we don't do more.

Now, I find that, and there is no doubt about it, this very important laboratory is suffering from a shortage of funds.

Mr. WEISL. From a what? I did not hear it.

Dr. TELLER. From a shortage of funds, money.

I have not looked into their books, and I cannot tell you precisely how big the budget is, and this is not perhaps a topic of discussion here. But I will say this: that the budget in Los Alamos is somewhere in the neighborhood of \$50 million a year.

Now, in asking around and in talking with people—and here I talk from quite a bit of experience—I am quite sure that it is badly needed to increase the budget of Los Alamos from \$50 million right away to \$55 million.

I am not talking, therefore, in this case of a great expansion of the expenditures.

I furthermore would like to say that Los Alamos and the atomic-energy field in general is in a somewhat favored position. The appropriations have been more generous in the atomic-energy field than in many other fields. And furthermore, the Atomic Energy Commission has done an excellent job in supporting, in the right proportion, its various laboratories.

I am not making a special case of Los Alamos. I am using it as an example because I have just been there, I have seen a simple and clear need where an added expenditure of 10 percent will increase the effort by much more than 10 percent, where it will make it possible to adapt the program to newly arising needs, where it will make it possible to attract to Los Alamos the kind of people and keep in Los Alamos the kind of people who must go there and who must continue to work there.

I think that unless such reasonable expenditures are made right away in fields like atomic energy and also, I am sure, the missile field, we will have fallen far short of the kind of response which we should make to the present situation.

Mr. WEISL. Has the request for this additional 10 percent been made and denied?

Dr. TELLER. I do not know in precisely what state this is. I am quite sure that the Atomic Energy Commission is fully aware of the needs at Los Alamos, and I am sure that they are trying their very best to supply this need.

Now, in precisely which stage of the complicated process things have bogged down, I mean the complicated process of making money available, I do not know. I am quite sure that I am probably the least expert on these financial matters here in this room.

I only know that the need is there, and that the need has not been supplied; and, in fact, the effect of sputnik has not shown itself yet as a change in the situation in this particular case.

I raised the question, "Didn't sputnik make a difference?" And the people in Los Alamos told me, "As yet, we have not seen that difference."

Now, I am sure it is not their fault. I am sure it is not the fault of the Atomic Energy Commission. I don't want to say where the fault lies. I am hopeful that there is no fault anywhere, and that a few more weeks will see the matter and similar matters in a better shape.

Mr. WEISL. What other suggestions have you, Dr. Teller, to accelerate our present effort to meet the danger that we face?

Dr. TELLER. I have no very specific suggestions. I would think that you have here a most excellent opportunity to find out from the companies which are working on this project, and from other companies which would like to be working on the project, and which have available manpower, you can find out from them what kind of additional efforts are possible without dislocating other efforts.

Because I feel very strongly that across the board, everybody is most eager to go ahead with the program, and that we must go ahead with it, we must accelerate, without stopping other efforts.

COOPERATION AND COMPETITION

I have perhaps this one specific suggestion which I am also sure does not require any great wisdom, and everybody is aware of it. We have quite a few programs in the Air Force, in the Army, in the Navy. Very nice things can be said about all of these efforts. I should like to say that it is important to bring about a close cooperation, a close exchange, between these various efforts, as well as between the efforts going on in the competing industrial companies; in other words, the competition, which is in general a good thing, should not be carried to the point where we are keeping secrets from each other.

Now, I don't think this has been done, but one should do one's very best to foster exchange of information.

I should think that as far as the efforts within this country are concerned, these are the simple and general things that I can say.

Mr. WEISL. Have you any other views as to the strengthening of our alliances abroad in connection with this effort to defend our security?

Dr. TELLER. I have been this fall over in England and looked at their air-industry show, and I was most impressed by this show, by the excellence of the British effort, not in the rocket field, but in a field close to that of the rockets.

I think that it is most important that we cooperate with our very able friends, not only in Britain, but I would like to see this done across the board in the NATO countries, and maybe with other allies.

I think that the suggestion that has been made toward such a cooperation is a most excellent one, and that it is an absolutely necessary one.

I should recall that during the war the British, Canadians, and ourselves worked together in the Manhattan District on the development of atomic energy, and I think that we had very, very valuable help from our friends abroad, and the spirit of cooperation was most excellent.

I think that the present emergency is perhaps greater than the emergency was at that time, and it is greater for the simple reason that it is less apparent. We are more apt to forget about the fact that we are in a very dangerous situation because no actual shooting is going on.

I think that the situation is dangerous enough to justify, in fact, absolutely to require, the fullest cooperation with our allies in the general field of developing technical things in the scientific field and most particularly in the application of science and technology to the development of weapons.

I would like to see such a cooperation go on jointly and closely, and without barriers.

DANGER IN EXCHANGING INFORMATION

Mr. WEISL. Do you think there is any danger in exchanging information and cooperating with our NATO and other allies?

Dr. TELLER. I think there is. We cannot fully cooperate without sharing our secrets. I think that if we share our secrets, if the secrets

become known to more people, then the probability of a leak will necessarily increase. I think that this is a danger.

I think that this is, however, a danger which we must accept, because I think the danger of not cooperating, of falling behind, is, in my mind, much greater still.

Let me put it this way: Right at the end of the war, 1945, 1946, we had a monopoly in atomic weapons. Of course, we shared it with the British and Canadians, who were in on the development.

But among us, among this close group, we did have a monopoly.

At that time secrecy was, I think, really justified. The fact that some of our secrets leaked, a most regrettable fact, still made it very important to keep the rest of it, because in just a few reports, big technical development cannot be given away.

I would not say that the Russians caught up with us because they stole our secrets. They caught up with us because they worked harder, and that is the simple fact.

Now, the point is that we have lost this monopoly. We have no decisive lead in practically any of the fields. Therefore, the very value of our secrets is not as great as it used to be, because the Russians can find out for themselves due to their own efforts.

Under these conditions, secrecy is still important, but less important than it used to be; and speed of development, on the other hand, is more important than ever.

I would advocate the closest cooperation with our allies, even if that means that some of our secrets will be lost a little faster, because we will, on the other hand, by cooperating with our allies, produce new secrets faster.

Mr. WEISL. In other words, you believe that the allies have a great deal to contribute toward the quick development of our defenses against a potential attack by an enemy?

Dr. TELLER. I feel that they have a very great deal to contribute toward the mutual defense, toward the collective defense of the free world.

Mr. WEISL. I think you told me, Dr. Teller, for instance, that the French were ahead of us in electronic development.

Dr. TELLER. I don't think that I told you that. I think that this is so. But I do not have any firsthand information.

Mr. WEISL. At any rate, some of our allies are ahead of us in some of the critical areas needed for the quick development of our defensive arsenal?

Dr. TELLER. Let me perhaps make a general remark. Science is an extremely broad field. It has incredibly many branches, and it consists of a bewildering number of specialties and specialists.

I know that there are extremely good men abroad, and it would be a very great miracle if in quite a few of these many branches they would not be ahead of us, nor is that anything to be ashamed of.

Science and scientific development and application of science to technology and to military technology, is just a field where cooperation pays off, and pays off in a big way.

HOW WE SHOULD MEET PRESENT DANGER

Mr. WEISL. Dr. Teller, have you any other suggestions as to the way we can meet this present danger which faces us?

Dr. TELLER. I don't know whether this is the right time for me to say at least a few words about our defense in the strict sense of the word, and about our meeting the immediate emergency that is facing us.

Mr. WEISL. Yes, sir.

Dr. TELLER. Well, it seems to me that there are two very obvious ways in which we can defend ourselves.

One is this: We must be prepared to strike back if we are hit, and we must be prepared in such a way that our ability to strike back cannot itself be destroyed by a surprise attack.

This is a difficult thing to do. In my opinion, it is possible.

First of all, it is possible because we have some organizations which have functioned extremely well, and which are functioning well, and I mean in particular the Strategic Air Command.

I believe that by being on the alert, by continuing to look to our defenses, and by strengthening them, by making our bases harder to attack, by dispersing our retaliatory force in every way possible, we can continue to make it certain, and clearly certain, that we can return any attack to which we are subjected.

This is one very important phase of our immediate defense.

Another—

Mr. WEISL. That would apply to the Navy and the Army, as well, would it not?

Dr. TELLER. It will apply to every form of our Armed Forces that can really and effectively contribute to this joint defense.

POWER TO RETALIATE

Mr. WEISL. And we must let it be known to the Russians that we have this power to retaliate.

Dr. TELLER. Obviously we must let it be known to the Russians; and, furthermore, in this phase, too, we must cooperate, as we are cooperating, with our allies.

One thing that this requires, of course, is an early warning system, a radar system. We have done a lot. We should be doing more. We must spend money wherever money can help. We can be helped in turn, very greatly, by the observation of our allies, by the bases that our allies allow us to use.

In all these ways we can prepare our defenses, and of course we have to be prepared to strike back with missiles as soon as we possibly can do so; in other words, develop our intermediate-range missiles and long-range missiles at the fastest reasonable rate.

Now, I think that all of us know, and I am deeply convinced, that such a force will never be used by this country or by the free world to attack Russia. But we must have it in order to be able to strike back if they would like to start such an engagement.

I think that this is one phase of the defense.

There is, however, another phase which can be more properly called defense, the passive defense. Is it proper for me to talk about that for a few minutes?

Mr. WEISL. Yes, sir.

Dr. TELLER. Or should I stay with this other and answer any more questions that you may want to put to me on this particular phase?

PASSIVE OR CIVILIAN DEFENSE

Mr. WEISL. I think it is proper for you to discuss all practical opinions that you may have which will show us how to strengthen our defense against a possible attack.

Dr. TELLER. Well, I believe that we could do very much more than we are doing today about passive defense.

Mr. WEISL. About what?

Dr. TELLER. Passive defense.

Mr. WEISL. Passive defense?

SHELTERS AND RADIATION METERS

Dr. TELLER. Passive defense, which I will describe as essentially defense by shelters and similar means. Of course, active defense is important, and it is a complicated matter about which I don't have specialized information, so I don't think I should talk about it. But it is obvious that active defense has at least one disadvantage. It becomes obsolete rather rapidly because the other fellow makes a new invention about which you may or may not know, and your active defense might be in trouble.

The passive defense is a more general kind of a defense. It has not changed so very essentially even between the Second World War and the present situation, and I think it is of more permanent value.

First of all, I believe that we can do more and we should do more, very much more, about shelters. I think that if we go at the development of shelters at a reasonable rate, at a reasonable pace, if you do not require that shelters give absolute security but just do the best we can, and couple the construction of shelters with other useful projects wherever this is possible, we can gradually build up a shelter program.

Mr. WEISL. May I interrupt you, Doctor?

Just what do you mean by "passive defense"? Do you mean a survival defense in the event we are hit?

Dr. TELLER. I mean the kind of a defense where, in case we are hit, we should be able to save the lives, not of all of us, but of the great majority of us.

Even so, there is no doubt that in an all-out war, there will be a terrifying number of casualties, but we can so prepare that all of us will have a good chance of survival, and most of us will survive.

And, furthermore, I believe that this defense should have a further phase, namely, a phase in which we should be prepared to get back on our economic and national feet.

Mr. WEISL. May I interrupt one minute?

Dr. TELLER. Yes.

Mr. WEISL. You spoke of shelters. Shelters against what, Dr. Teller?

Dr. TELLER. Well, this is a difficult and complicated problem, to which, however, I have given a little thought. I have in mind, first of all, shelters against fallout. A shelter against fallout can be very easily and very cheaply constructed. In areas which are not closely built up but in areas to which the wind may carry radioactivity, such shelters could be put up at relatively small cost.

Connected with that, of course, we need a program which exists today but which I am sure is not vigorous enough, a program of

making available to people cheaply and in an appropriate form, radiation meters so that they should be able to find where are the dangerous spots.

Then, I mean something more and something more difficult. In the closely built-up regions, in our cities, there is a danger greater than the fallout, and also greater than the much advertised shock. Of course, immediately below a powerful bomb or in the immediate neighborhood of a bomb, you may find that there is not very much you can do unless you go to really terrific expenses.

BOMB DAMAGE

However, most of the damage of the bomb is not direct. Most of the damage, even in those cases where we have experience, is done by the fire storm, by the conflagration which follows such an explosion. Houses are knocked down, a great number of small fires are started, and in the updraft that results, all these coalesce into the kind of a fire which we have seen in the two cases at the end of the last war, and this fire storm is likely to claim more victims than anything else.

In the closely built-up areas, we have to face the difficult problem, and it won't be faced, it won't be solved within a year or 2, but it can be solved gradually—how to get a system of shelters which can withstand the fire storm where people can go and stay for the hours while this fire storm is raging, and be supplied with the necessities, including air.

Mr. WEISL. What else would you do besides building shelters against fallout and for survival against a fire hazard?

Dr. TELLER. Well, I believe that if we prepare in a reasonable way, we can feel certain that a great majority of our people will survive an attack.

At the same time, we can by no means guarantee that a great fraction of our industries will survive. In fact, it is quite likely that our industries will be knocked down. And this recognition, this fact, has given people a terrible feeling. Many are apt to throw up their hands and say, "What's the use in surviving? We won't have a country left in any case."

Now, I believe that this attitude is mistaken. I think that America is a rich country; I know it is a rich country, and I think that we can make arrangements so that we have a well hidden nest egg from which to rebuild industries if we ever are hit.

FOOD STORAGE AND SUPPLIES

Let me give you the most obvious example. We have great stores of food supplies which at present we consider a nuisance. In time of war, these food supplies, for the next 2 years, may be a lifesaver in the most literal sense of the word. A very simple and easy measure which I would advocate: to take this food supply and distribute it throughout the country in such a way that it should be safe from fallout, out of the range of the immediate probable targets, and disposed in such a way that in case of emergencies it should be readily available to people.

At the same time, we have to build up stocks, stockpiles of those commodities which have a key importance in rebuilding our industry.

This may mean some transportation equipment, trucks; this may mean some raw materials; this may mean machine tools; it may mean a lot of things.

All this will not come easily, and has to be done carefully and in a considered way so that it should not become too expensive.

To the best of my knowledge, we have not even studied thoroughly the question how much such a program will cost, and I cannot tell you how much it will cost. But I feel convinced that this is a program which a rich country like the United States can undertake.

A country where the masses are starving, as Russia, I think will be in a very difficult position to match us along this purely defensive line, and we might be able within a few years to put ourselves into a position where the Russians can hit us badly but not so badly that we cannot recover, and at the same time we shall be able to retaliate in such a way that they won't be able to recover.

Under those conditions, I think we can begin to feel sure that as long as we keep up these defenses, the all-out danger will not occur. We can avert war by real preparedness, including this defensive preparedness.

Mr. WEISL. Is that about all that you can think of to tell the committee about our short-range program or our immediate problem?

Dr. TELLER. Well, I would think, yes, and perhaps I have outstepped our classification, because some of these things I have talked about are obviously longer range. Some are certainly short-range, because some of these things could not only be started but executed within a year or two.

Mr. WEISL. Now, if you will kindly, Dr. Teller, turn your attention to the long-range program. May I state—

Dr. TELLER. May I please interrupt for a moment and presume on your kindness to ask for a 5-minute interruption? I am really quite tired, and I would be happy if I could continue in approximately 5 minutes.

Senator JOHNSON. The committee will take a recess.
(Short recess.)

Senator JOHNSON. Will the committee please come to order.

Dr. Teller, are you ready to resume with your testimony?

Dr. TELLER. I am, sir.

Senator JOHNSON. Will you proceed, Counsel?

Mr. WEISL. Dr. Teller, when the chairman briefly read your biography, he omitted to mention, which I would like to mention, that you are a member of the General Advisory Committee of the Atomic Energy Commission; is that not correct?

Dr. TELLER. That is correct, yes, sir.

Mr. WEISL. By whom were you appointed to that Committee?

Dr. TELLER. By President Eisenhower.

LONG-RANGE DEFENSE PROBLEMS

Mr. WEISL. Are you ready, Dr. Teller, to go into what we call the long-range problem that we must seriously consider in order to prepare for the defense of the United States?

Dr. TELLER. I am ready.

COMPARISON BETWEEN UNITED STATES AND SOVIET SCIENTIFIC AND TECHNOLOGICAL STATUS

Mr. WEISL. Would you be good enough, in your own way, to compare the scientific and technological status of the Soviet Union with the scientific and technological status of the United States?

Dr. TELLER. I will have to concentrate mostly on the scientific end, because that is the one about which I have much more knowledge.

Mr. WEISL. I might add, at the beginning you felt, at least I had gathered from my interview with you that you felt, that the United States faced two great dangers, both almost equally important.

One was the immediate danger of a possible attack by Russia, which we hope will never take place, and the other was that of a technological and scientific attack. In other words, if Russia beat us scientifically and technologically, we might become a second-rate nation rather than a leading nation of the world.

Dr. TELLER. I am afraid that that is precisely true.

Mr. WEISL. Will you please continue?

Dr. TELLER. I will attempt to do so.

I think the main danger I have already mentioned. The Russians are catching up with us and have surpassed us in certain fields. Their rate of advance is considerably faster than the rate of our advance.

I think that this is perhaps more clear in science than in any other field. They have stressed science very greatly, and they have built up their scientific manpower in a most admirable, most remarkable manner.

Now, I would just like to say at the outset that we have plenty of evidence that the Russians are doing this, and that they are doing it on an extremely broad front, including the applied sciences, including basic sciences. There is just no stinting of means, and they are going ahead as fast as they possibly can.

I think it is almost unnecessary to say what I am going to say right now. In the past years, it has been asserted, "Well, the Russians have taken a few German scientists over, and the German scientists are doing it."

I never believed that, and I doubt that there is anybody left who believes it.

It is quite clear that the Russians, while they tried to get all the help they possibly could get, have done the main job themselves. I do not know, would it be a good idea, perhaps, if I just tried to explain why and how the Russians could do this? Because they have done something that is, as far as I know, without precedent.

I think that in a way the explanation is quite simple and straightforward. The philosophy that the Russians profess puts a very great weight on scientific and technical accomplishments.

If they do not go ahead in those fields, then they have condemned themselves according to their own ground rules. Also to build up a scientific capability must come first. Technology is the second step, and also necessarily the slower step because more material means are involved.

This has led in Russia to the situation where I think the scientist is in a quite unique position.

Most people in Russia starve. If you do not want to starve in Russia, then there are two ways to get an agreeable life. One is to

get a lot of responsibility, for instance, become a more or less prominent member of their one party.

The other is to become a scientist. If you get a lot of responsibility, then as far as I understand, you also lead a comfortable life, but by no means a secure one.

If, on the other hand, you become a scientist, you have as good a life and as secure a life as you possibly can have in Russia. Now that is only part of the story. It is not only true that you are comfortable. It is also true that the Russian scientist is very greatly honored. Scientific books in Russia have a sale which outstrips the sale of scientific books in the rest of the world by something like a factor of 10. It is an amazing phenomenon. Their scientists are honored, and to some extent even understood, by the general public.

Even those in Russia who are not scientists themselves are trying their hardest to understand something about scientists. Quite a few of our scientists have recently visited Russia. I myself did not. The stories which we hear from them—and I talked with a great number of them—are quite uniform.

Generally they were welcomed and they could talk with the man in the street. Generally they found very little if any hostility. But when they mentioned that they were scientists, that brought smiles and a real welcome out in every case.

The word "scientist" just has a connotation in Russia which is not present in our country.

A Russian boy thinks about becoming a scientist like our young girls dream about becoming a movie star. It is just the best thing you can do; the best, the most active minds are attracted to this field, and they are given both the means to live decently and all the honors they can dream of.

Now, under these conditions, of course, and with practically no limit on expenditure, it is not a surprise that Russia has gone ahead.

Let me perhaps give you now two further examples.

The Russians have gone ahead quite vigorously in a field which is, I think, known at least by name to most people, high-energy physics.

Senator SYMINGTON. Excuse me, I did not hear that.

Dr. TELLER. High-energy physics.

You take one of the smallest particles, the nucleus of the hydrogen atom, a proton, and accelerate it to a velocity very nearly that of light and concentrate in that particle a very great deal of energy.

Now you ask me why we are doing it, and when I tell you that this is one of the most expensive, perhaps the most expensive branch of university sciences, you will ask me the more "Why do you spend this much money?"—quite a few million dollars. My main answer will be—I will try to tell you in more detail if you want to hear, but my main answer is—I do not really know.

We have plenty of reason which I can explain. There are plenty of reasons to assume, in fact we have seen this, that when such a very fast particle hits another particle, a whole number of new and strange kinds of things are generated.

They have funny names like "mesons" and "hyperons," and I don't need to talk about it although I could and I would like to.

They are funny. In the long run we are probably going to discover something about them and we will gain control in a new field of the world, but where we are going we have really no idea.

The practical possibilities are no more clear to us than was the possibility of discovering America when Columbus started westward. The main point is that we do not know where we are going when we are doing the most interesting things, but there are a number of indications that we are going to find something.

Now, in this field which is as yet impractical, the Russians have been way behind us, but now in the last year they have completed a machine which is better than the best machine so far in existence.

The best machine which is now the second-best machine I am still moderately proud to say is located in Berkeley in the radiation laboratory, but the best machine today is in Moscow.

To do that they have to use a great deal of steel. Quite a bit of the expenditures goes into steel. The Russian steel production, I don't know what it is—is it about 35 percent of ours, is it 40 percent of ours, something of that kind?

They put into that machine something like five times as much steel as we put into ours. As soon as it comes to explore these new regions, there is no limit to what they will be doing. They have been advertising quite generally that they are prepared to go to the moon. Why?

It you want to we might get back to that question. When you get there almost certainly, not almost certainly, with absolute certainty, you will learn a great number of things.

These things at first will seem impractical. Their practical consequences will occur later. The Russians have shown in many examples that they are quite willing to support this impractical science, which is the breeding ground of the practical science which in turn is the foundation for the real technological advances.

They took a broad program and they were not saving any effort, and that is the way they have beaten us.

May I just stop at that point or shall I go into our own side of the picture. I would be very, very happy to elaborate on any part of this if I am asked to do so.

MR. WEISL. Will you elaborate on it as much as you want and as simply as you can so that we simple minds can, if possible, understand it?

GOING TO THE MOON

DR. TELLER. Shall I tell you why I want to go to the moon?

MR. WEISL. Yes, sir. [Laughter.]

DR. TELLER. Well, I have already told you in a way. I don't really know. I am just curious.

MR. WEISL. But seriously speaking, you believe that people will go to the moon, do you not?

DR. TELLER. I am certain that people will go to the moon and will get to the planets. There is no question about that in my mind.

Now when we get to, let us say, the moon or to Mars, I can tell you one or two things. You probably have thought of it yourself. We would want to do it, for a purely scientific reason and with no practical implications, for the time being.

For one thing, I would be extremely anxious to put up an observatory on the moon. We are looking out of our atmosphere in just a few wavelengths: first of all in the visible region and since the war in the region of some radar frequencies.

This region of radar frequencies has incidentally taught us a great deal about the universe, has led us to recognize, for instance, that whole galaxies consisting of billions of stars sometimes collide, and this collision of galaxies is beginning to be studied due to their discovery by radioastronomy.

Now, when we go to the moon, a possibility of looking at the universe will not be just in a few wavelengths in the visible and a few in the radar region. It will be over the whole spectrum. This is an increase in information very much greater and the increase in fullness of the picture very much greater than when you go from black and white to colored pictures.

I would like to look. I want to go to the moon because I can use it as a platform to look even farther. Even though I know that the moon is a very inhospitable sort of place, I will look for any kinds of traces of life. They may show up in some strange and unexplainable chemical combination.

I will certainly look for something like that when we get to Mars. It is quite possible that when we get there first we won't even recognize life because it will be so strange that it will look like no life.

Nevertheless, by and by we might learn things, and by that we might learn something about ourselves, which is certainly extremely interesting. So I would like to say that in the field of the exploration of the moon and of the exploration of the planets there are a great number of most interesting and most inspiring things, and practical things will come a little bit later.

I don't know, would that suffice, and shall I go over to the American side of the picture?

Mr. WEISL. You are certain that the Russians are going to make these explorations and are working exceedingly fast in that direction, are you not?

Dr. TELLER. They have all the technical foundations to do it. They have advertised that they will do it to their own people. Therefore it does not sound like boasting. They said to their own people, they have made films of it and shown to their own people how they will do it.

Now, if they don't do it, then of course they lose face internally.

Why should they do all these things if they would not be planning it? And furthermore, it is in my opinion the reasonable and right thing to do.

MILITARY ADVANTAGE

Mr. WEISL. In your opinion will the success of this mission to the planets and the moon have any military advantage and significance?

Dr. TELLER. I am sure that it will have a great practical advantage, and I am sure a great peaceful practical advantage, and I am sure it will have also a great military advantage.

But don't ask me please what it is. My imagination is not good enough for that.

If you had asked me about ballistic missiles in 1945 or 1946, I would have said, "Let's do it and let's do it fast," and then you would have said: "In what particular way will you apply this in a possible war," and I would have told you, "I don't know, but once we make it we will find some use."

And I think going to the moon is in the same category.

I cannot tell you in black and white what will be the advantages. I could dream up some sort of systems which need the moon, and then I can dream up counterarguments and I can argue for as long as you please.

But the fact is that if you make such a very big step like going to the moon, it will have both amusing and amazing and practical and military consequences.

That is how it always was in the world.

INCENTIVE FOR SCIENTISTS—FREEDOM OF RESEARCH

Mr. WEISL. Dr. Teller, you have told us that in Russia the scientist, or the potential scientist, is given every incentive to become a scientist, to study science. He is given high salaries, high honors, and great respect. Now will you tell us how that compares with the treatment of science, scientists, and education looking toward the making of a scientist in this country.

Dr. TELLER. I am anxious to do so. Our country is a democracy and we are all most anxious to keep it a democracy and to make it a more perfect democracy, and I think that it comes closer to the democratic idea than any country in the world, and this means—and it is a good thing—that practically everything we are doing we are doing for the common man.

The differences between people are small. If something is not enjoyed by the common man, by the man in the street, it is usually considered very considerably less important, and in general I consider this as a fine thing.

It is as it should be. But then you come to a field like science, a field for which I am sure most people, perhaps even all people, could develop a taste. But a taste for science is an acquired taste, and most of our people have not acquired that taste.

There is a word, a single word in the American dictionary which is most expressive and summarizes the situation—the word “highbrow.”

Mr. WEISL. The word “highbrow”?

Dr. TELLER. Highbrow, yes. It means that the American people consider the scientist as a person apart. It is all right if he plays his little games, and sometimes these games become practically important and by that time the people are really interested.

But the scientist himself has no real, close connection to the understanding of the people.

Now, I think that this is a dreadful mistake. Good drama can develop only in a country where there is a good audience.

In a democracy particularly if the real sovereign, the people, expresses lack of interest in a subject, then that subject cannot flourish. You can tell your child that it is a good thing to study mathematics or physics or chemistry. If you yourself have not interest and no understanding for these subjects, none at all, then a child is very fast in discovering that you are preaching something which you yourself do not follow, and he will treat your advice accordingly.

The spirit in our schools is such that a kid who is interested in science is ridiculed by his fellow students, and he will very rapidly lose that interest.

Now I would like to make a statement of my conviction of a very broad, almost philosophical field, and I know there are many who won't agree with me but I believe it.

You might ask me what is talent, what is genius, and I think I know, and it is a very simple thing.

Talent and genius is nothing else but specialized interest.

Now such interest very frequently arises spontaneously. Sometimes it has to be stimulated. But even if it arises spontaneously, unless it gets some stimulation, some response in its surroundings, it will die.

I have often heard statements, "We have enough talented children, we only need some money so that they should get more education." Money is actually needed.

But first of all, such a thing as a talented child, a talented child in the field of science, I don't know what that is. The talent is not something which is or is not. The talent is something which develops and is developed by the response of the surrounding, and this response is not good enough in our country.

Now one often hears the statement: To single out a group of young people who happen to be interested let us say in mathematics, and give them special treatment is undemocratic.

I would like to ask the question:

Is it undemocratic to give special treatment and also special admiration to football players?

Those we certainly give all the stimulation possible. We do not take them out of our schools. They remain in touch with the others, but at the same time we give them every incentive, first of all psychological incentives to go ahead in this field, which can be enjoyed by so many people.

Our scientists need not be admired more than our football players. I mean the young ones, I mean the 10-year old scientists and the 15-year-old scientists. But they should get, I would like to say, perhaps with some lack of modesty, as much admiration as a football player.

I think this is the first condition. But to put it into effect is another thing and is a complicated and difficult thing.

I should like to start with the schools, and I should like to read to you a very short statement from a very respected person in a high position who is, you will agree with me later, not given to overstating Russian accomplishments.

He says:

This is the cold war of the classrooms. In 5 years our lead in the training of scientists and engineers may be wiped out, and in 10 years we could be hopelessly outstripped unless immediate steps are taken to correct it. A situation already dangerous within less than a decade could become disastrous.

Now unfortunately this statement was not made yesterday. It was made a little more than 2 years ago, and it was made by the Chairman of the Atomic Energy Commission.

I feel that it is most necessary that we change the situation in the schools, I mean the high schools and I mean also the elementary schools, because by the time a kid is 12 years old he probably has adopted the mental attitudes which will make him a good scientist or else which will definitely get him interested in some field other than science.

The first obvious thing that is necessary, is that we have to pay more, much more to the science teacher.

Science is in short supply in this country. Any good scientist can get at least twice the salary but probably 3 times or 4 times the salary in an agreeable job in industry or elsewhere than he can make as a teacher in high school.

Our best science teachers are taken out of the high school. Our high schools and even more, our elementary schools are left completely bare of people who know something about science.

How shall a child become interested in science when, in all his life, in all his young life, he does not get in touch with a person who himself is interested in science?

Now, I am not a specialist in teaching either in the sense of the word in which it is used in the elementary schools or in the high schools.

I am only a university professor. But I feel that one of the most important elements in teaching is imitation. If you go into a class with a bunch of children, and if you make clear to them just one simple thing, that a subject exists and that you are passionately interested in it, they will want to do the same thing.

They will get interested, too. We are descended from monkeys, and imitation is one of our most strong impulses.

But if there is no one to imitate, then what do you expect?

I think it is very necessary that we pay our science teachers in elementary schools and high schools more. We must find those kids who show any interest, who will grab hold of a problem and not let go.

That is the real sign of the interest, not to be quick but just to be thoroughly interested. These children should make contacts with other scientifically interested people so that their own interest should be stimulated.

I believe that it might be worth while to work out some system by which university scientists, pure researchers, scientists from the industries should be giving some fraction of their time, oh, maybe 20 hours each year, whatever you will, to talk to children in the elementary schools and in the high schools, to make them acquainted in the simplest possible terms with their own field, and give them a picture of what science is about.

Let me try to put the same thing in a slightly different way. We talk a lot about general education, and general education is an important thing.

Yet when it comes to a question like an atomic nucleus, and I try to talk to people about atomic nuclei, I just see them shudder and I see their ears close almost as though it were a physical act. This is obviously something too difficult, it is the black art, we are not interested in it.

We have to correct this situation because we are living in a scientific and in an industrial age, and a person who is not acquainted with the basis of our material civilization is not completely educated.

I am therefore advocating that the talented ones among our kids should be given plenty of opportunity to go ahead and develop their talents, and the mass of our children should be given something which may not be terribly strenuous but should be interesting, stimulating, and amusing. They should be given science appreciation courses just as they are given sometimes music appreciation courses.

We do not necessarily want to make a musician of everyone. In fact we definitely don't. It would be a terrible world. But a rather general enjoyment of music contributes to the fullness of life. A

general appreciation of science would similarly contribute to the fullness of life and, more than that, will contribute to our safety.

Now, I would like to approach this same problem in still another way. There are in every society a number of people who are charged with the terrible responsibility of making decisions. This decision must be based on knowledge.

Now to my mind it is obvious that a person who is narrowly specialized in order to do the difficult things that he is doing, a scientist, is as a general rule not the right person to make decisions because he does not usually have a sufficiently broad view of the world.

I don't want to make any absolute statements, but as a rule I want to make this statement. So the people who have to make the decisions in order to get the basic facts which they need, will have to go to the scientists and ask them for special advice.

Now, this advice that you will get from us scientists is like all advice; it will be, sometimes, good advice and it will be, sometimes, bad advice, and it is your agreeable job to distinguish between good advice and bad advice.

One thing you can do is that you take the reputable ones, and that is good advice, and the less reputable ones, and that is bad advice.

But, unfortunately, the world is not as simple as that. Life is complicated, and the best of us, for a number of reasons, will make mistakes.

For all I know, the advice I am giving you right now might be bad. You will have to decide.

Now, therefore, the person who makes the decisions and, ultimately, even the real sovereign, the man in the street, he cannot be a scientist but he must develop an ear for science so that he can distinguish good advice from bad advice, good science from crazy fiction.

This, I am sure, can be done, but it needs a lot of doing. It needs a change in the attitude of 165 million people. The main thing I am trying to say is that this education process, while necessarily slow, is, in the end, really necessary, and at the same time it need not be, and, in fact, it must not be, a painful process.

We simply have to spend more effort to say to the public, in simple and straightforward terms, what all the science is about.

The highbrows, because they have been called highbrows, have gone off into a corner and started to talk to each other in terms of polysyllables which have become so complicated that, in many instances, they do not even understand each other. [Laughter.]

We have to cultivate the simplicity of expression. We have to do everything in our power to make it clear what is really new in physics, in biology, in the various sciences.

You have heard about relativity, and you have heard about quantum mechanics, and you say this is something only for geniuses. Nobody else can understand it. May I please say this is complete nonsense. Five hundred years ago it was only for geniuses to know that the earth is round.

Today every child knows that the earth is round. We have found simple methods, visually and with words, to explain to them what all this means, and the more clever ones among us can even figure out what happens when we cross the dateline.

However, of the new surprising scientific discoveries we shy away. We close our ears. Even scientific discoveries which have been made 25 years ago and 50 years ago, they still have not penetrated to the public because the public is too afraid of them.

I think that there is a lot to be done about closing the gap between the specialists and the common man, and only when that gap is closed is it possible for our people, for our scientific people, to have the feeling that they are playing to an audience.

If they are not playing to an audience, they surely won't play as well.

In Russia, the scientist is driven forward by the whip of hunger, by the fear of misery, and by the reward of honor.

We are living in a world which is successful in eliminating, progressively, misery. We cannot and we should not drive our scientists ahead with any sort of a whip, and we have, by leveling our society, by making the standard of living so even throughout the country, effectively abandoned this particular kind of a whip.

I also don't want to say that any group of people, and the scientists in particular, should be put on a pedestal as they are put on a pedestal in Russia. That, to my mind, is distasteful. But I would like to say that people should be interested in scientists, in science, not only in the results produced but also in the ways, how it is produced.

Our sports fans do not merely look at the score of a football game, but they look at the game play by play, and they know who made what mistakes and who was brilliant in what manner, in what way.

Now, if a similar general understanding should spring up, I am sure that we can outproduce the Russians in the scientific field as well as in every other field, because we can add to the fact that we will have many and good scientists the fact that the scientists' imagination and work will be much more untrammelled, much less directed. This or that inconspicuous scientist will come up with something that does not look particularly important and then, suddenly, it becomes extremely important.

Freedom of research is much more important, freedom of action is much more important in science than anywhere else. But it must be accompanied with genuine public interest.

Now, I think that is essentially what I wanted to say, with possibly one exception, and I do not know whether I should further take the time of this committee.

I wonder, Mr. Weisl, whether I might ask you: Would it be proper for me to go on and talk about my fears, of which you know, that we might get left behind Russia and really find ourselves in a completely indefensible position, even without active war?

Mr. WEISL. I think that anything that concerns the defense of this country, either by military weapons or by scientists or any other means, is of great interest to the Senate committee.

Dr. TELLER. I have in mind—let me be quite brief, and elaborate on it only if you ask me to elaborate on it—I have in mind developments which do not seem to be concerned directly with defense, but which are, nevertheless, of very vital interest.

Mr. WEISL. Perhaps you could give us 1 or 2 illustrations of how pure science has led to the development of defense against attack, or the preparation for a defense against attack?

Dr. TELLER. Well, I am sorry; I do not know what particular phase to mention. The most obvious thing is——

Mr. WEISL. Certainly, the intercontinental ballistic missile was developed from research in pure science?

Dr. TELLER. That, certainly, is true. I would perhaps quote, with even more direct knowledge and, perhaps, even more aptly, nuclear

science. The leading man in nuclear science in the first decades of the century was Lord Rutherford in England, and I heard him say, publicly and with full conviction, that the atomic nucleus cannot be put to any practical use.

He said that in my hearing—I am not quite sure whether it was in 1934 or 1935—at a scientific congress.

He said there are some visionaries who think that nuclear energy could be used for a practical purpose, and he went on record, saying, "This is impossible."

You know what has happened. You know that in our military preparedness just a few years later the opinion of the greatest expert and the pioneer was proved to be, to say the least, conservative.

Is that the kind of thing you would want?

CONTROL OF WEATHER

Mr. WEISL. Yes, sir; for instance, the control of weather.

Dr. TELLER. Well, this is a question about which I am very anxious to talk, and it is connected with——

Mr. WEISL. I mean as it is connected with the defense of the country.

Dr. TELLER. It is connected with defense by all means.

Let me say the prediction and control of weather. Certainly it has been recognized for a long time that weather prediction is most important for military operations, and I know that, for instance, our Air Force is very actively engaged in this field.

There are a number of extremely interesting developments. We are collecting data on the weather more widely than it has been collected before, because we are collecting data from all altitudes and we feed these into elaborate computing equipment, and we begin to make, with some little confidence, predictions about the weather 5 days ahead.

Nevertheless even though we recognize the importance of these things, we have cut out, in order to save a few million dollars, a few years ago we cut out the observation ships from the Atlantic so that we observe weather over big areas of the world only by occasional traffic.

I think that this was a great pity and the ships should be put right back in order to be better oriented in predicting the weather when we need it.

Furthermore, the weather prediction will have its limits because ultimately we find again and again that small causes in the weather can lead to very big effects, and when that is the case, prediction becomes very hard.

But if we find out precisely where the small causes lie which may trigger off the bigger effects, if we find out that, we will be on the road of controlling weather on a big scale.

I do not say that this can be done or will be done.

I say that it is quite possible that it will be done within the next decade or two.

Please imagine a world in which the Russians can control weather in a big scale, where they can change the rainfall over Russia, and that—and here I am talking about a fairly definite situation—that might very well influence the rainfall in our country in an adverse manner.

If we protest they will say, "We don't care. We are sorry if we hurt you. We are merely trying to do what we need to do in order to let our own people live."

What kind of a world will it be where they have this new kind of control and we do not?

I think, if you think about this and other examples, it will become very vivid in your mind what it might mean to become a second-class power.

Senator JOHNSON. I might observe the way the weather has been acting down in my country some people suspect the Russians already control it. [Laughter.]

Dr. TELLER. I must say that if we learn how to control weather, this will have one very bad consequence because it will eliminate the last safe topic of conversation.

Sir, I think that my mind is more or less blank by now.

DEVELOP HIGH-GRADE SPECIALISTS IN THE MILITARY

Mr. WEISL. Dr. Teller, I have unfortunately had the disadvantage of having talked to you only a short while before you testified, so that if there is anything that I have not asked that is material to this hearing that you would like to discuss, I wish you would do so.

Dr. TELLER. There is one thing that I know I did not mention, and I feel unhappy about it and I would like to return to it out of context.

It is a strictly military matter, and I feel that though it has been said often, it should be said again.

When we talk about our preparedness to absorb an attack, to retaliate, when we generalize this into many other situations which might arise, I am more and more impressed by the fact that the task of the military, of all branches of the military, the Army, the Navy, and the Air Force, is becoming, with every passing year, a more highly technical task, requiring a very elaborate technical education.

It is absolutely necessary that we should develop a professional armed service containing people who are high-grade specialists in their field.

I know this has been stressed by many of the military, and even though I am not as close to it as they are, I have had the privilege to look at the situation in many different connections, and I should like to say that a man trained for only the period of 1 year is usable in only a few and rather specially circumscribed situations, and the main strength of our defense will have to rest with the professionals.

Mr. WEISL. That is all I have to ask, Mr. Chairman.

Senator JOHNSON. Thank you, counsel.

Thank you, Dr. Teller.

FIVE PRIORITY ITEMS TO BE DONE

Senator JOHNSON. Dr. Teller, I have 2 or 3 questions that I would like to ask you. I will try to be as brief as I can.

You have earnestly and convincingly described to the committee the seriousness of the dangers, both short- and long-range, that face this Nation.

I wonder if you would summarize very briefly for us, or perhaps give us a schedule of priorities that you would set up to meet these most urgent problems.

Dr. TELLER. You are asking me a very difficult question, and I don't think I am able to answer it. I will make a feeble attempt.

Senator JOHNSON. I want to make that question as simple as I can. We have heard for 7 weeks now a lot of generalities about the satellite. And we have heard, in addition to that, for many years the possibilities that were just ahead for missiles; but I think the thing the American people want to know is what can we do now?

Dr. TELLER. Yes, sir.

Senator JOHNSON. Therefore as a distinguished scientist who has made a great contribution to our country, and has made, in my opinion, another great one this morning, I should like for you to tell us what you would do now, 1, 2, 3.

Dr. TELLER. There are a great number of things that we can do now. I think that the things that I can think of I would hate to put into an order of priorities because they are possibly in different and non-conflicting fields.

One thing I would do is to look carefully into the question of our SAC defense.

Another thing I would do is to——

Senator JOHNSON. Will you repeat that now—SAC defense?

Dr. TELLER. Defenses—SAC preparedness to strike back in case we are attacked.

No. 2, I would look carefully into the question in what reasonable way can our missile program be accelerated and expanded, and I would like to distinguish between acceleration and expansion. Acceleration means that we try to get the weapons which are now planned ahead of schedule. It is not enough to be on schedule, and I think that if we really go after it we could be ahead of schedule.

Senator JOHNSON. In your opinion can it be accelerated?

In your opinion can it be expanded?

Dr. TELLER. In my opinion it can be both accelerated and expanded, and I say that without special knowledge, but I say it because I have talked to many people who have specialized knowledge, who have the ardent desire to contribute, and who are not contributing today.

I furthermore think that cooperation with our allies will help to accelerate and expand the program, perhaps a little bit more to expand it.

Now by "expansion" I mean work on all kinds of things which will lead to a more rapid development of the next generation of weapons and a more rapid progress into what now is very generally described by the one syllable "space."

I am quite sure that there are a number of deserving projects to be performed not just as a stunt, but to be performed in order to get more knowledge, to find out what is up in the high atmosphere, what we see in the high atmosphere when we look back on the earth, exploration of this kind has not been thoroughly encouraged.

There was the Vanguard project, a most excellent project, but it was an isolated point where we should have been progressing along a broad front.

So this is one thing that we have to do.

Another thing that we have to do right now is to look to our passive defenses, shelter program, the more general distribution of radiation meters, at least an investigation into the question what need be done in order to put this country into a situation to reconstruct itself if it should happen to be hit very hard.

These things could begin right now and should.

I am quite sure that there are many other things.

I feel it has not been mentioned here that we possess a very powerful weapon which we are not developing as fast as we could, and I would hope that we are developing it, that we shall be developing it faster, and that is the nuclear-powered submarine.

I think it is an extremely important field in which we could accelerate our program with more money and also with more research.

And finally I feel that it is most urgent that we make an immediate start with the real long-range programs to look to it that we have a better science education in our elementary schools and in our high schools, and look to it that we do much more than what we are doing now about popularizing science, about developing the atmosphere in which the scientist can make and will make his full and proper contribution.

I may have, quite wrongly, omitted something from the list, and if this should be pointed out by anybody I will gladly acknowledge it.

Senator JOHNSON. So summarizing it, you would look very carefully into the question of increasing the strength or improving it where needed, of our SAC defense.

You would try to accelerate and expand the missile program. You would study and probably initiate an adequate passive defense program.

You would attempt to accelerate the production in number of nuclear-powered submarines.

You would make an immediate start to have better science education throughout our entire educational system?

Dr. TELLER. Yes, sir.

Senator JOHNSON. And those would be the five high priority items?

Dr. TELLER. They are very high priority items, and I do not think they conflict, and I don't think they will conflict.

Senator JOHNSON. Now which is the greatest threat, the short or the long range, in your judgment?

Dr. TELLER. I don't know.

SPEEDUP OF BALLISTIC MISSILE PROGRAM IMPERATIVE

Senator JOHNSON. What basic things must be done to speed up our intermediate and long-range ballistic missile program, in your opinion?

Dr. TELLER. Well, the immediate thing I think is to operate through the agencies which are now active, and explore carefully in what way, by means of overtime, by means of overtime work, by means of drawing into the effort additional competence one can make more rapid progress.

This will need very careful and detailed investigation, and I think is a huge job.

I think that in the long run, a somewhat longer run, one should give very careful thought both to the cooperation with our allies and

of organizational questions trying perhaps better to tie together our numerous excellent efforts.

But I feel that any such reorganization must proceed very carefully so as not to disturb the good programs which we have going at present.

Senator JOHNSON. Do you think that the missile situation requires substantial overtime work and that even multiple shifts might be indicated?

Dr. TELLER. I would be happy to see it if the companies and technical people involved should say that it is feasible. My guess is that it is feasible, but I cannot positively assert it.

Senator JOHNSON. And do you think it is wholly desirable?

Dr. TELLER. I think that it is something that is vital, if it can be done.

Senator JOHNSON. Dr. Teller, is what you say about the importance of increasing American strength and science and technology merely a matter of desirability, or do you consider it absolutely imperative to the survival of this Nation?

Dr. TELLER. The latter.

Senator JOHNSON. Senator Saltonstall.

Senator SALTONSTALL. Thank you, Mr. Chairman.

Dr. Teller, may I first say that this is one of the most interesting two hours and a quarter that I have spent since I have been in the United States Senate.

Dr. TELLER. Thank you.

STRONGER AUTHORITY REGARDING DUPLICATION OF EFFORT

Senator SALTONSTALL. I think you make an excellent witness and a witness that we can understand. Now, may I ask you just 1 or 2 questions to supplement what Senator Johnson said.

You spoke of the weapons being developed and the acceleration of the program. Are our efforts too scattered, in your opinion? Should we decide which are the most essential of our weapons and concentrate on those?

It seems to me that one criticism perhaps is that we are scattering our efforts too much.

Dr. TELLER. I feel that I am not really well qualified to answer this question. I have the general impression that most of the efforts that go on are thoroughly worthwhile. I even would guess that all of them are worthwhile, and I would hesitate to shut down any one and try to transfer personnel from one to the other. This might result in more disorder than speed. I think that some more thought should be given, and I am sure is being given, to the question how better to coordinate the effort, how to eliminate duplication so that if you have two similar objects, two groups working upon similar objects, these two objects should, from now on, if possible, diverge in their applications so that we should cover a broader field.

Rocketry does not mean just one aim. One has the intermediate missile, one has the long-range missile, one has the problem of the satellite with its own military applications, one has space exploration, one has among the missiles, missiles of all kinds using all kinds of fuel, and some fuels have the advantage of being more powerful. Other fuels have the advantage of being more readily available if an on the minute availability is required. We are talking about a very rich

field, and I think all the various projects which are going on now could be used in this rich field, if enough imagination is applied; and I would not like to throttle down any progress, but I would like to see that where there is a too great parallelism in endeavor, that one should try to differentiate a little bit more and try to find how best to use the force we have.

Senator SALTONSTALL. In other words, you do not believe that the competition on these various missiles up to the present time has been wasteful, shall we say, and nonproductive, but what you do believe now is that possibly there should be one, perhaps a stronger, authority over the whole situation that can determine how best to coordinate the efforts?

Dr. TELLER. I am sure that this should be done and is being done. I have the feeling that such an authority must find its way carefully into the present situation, but gradually should take a very strong hand indeed. I furthermore have the feeling that such an authority is most useful if it is acting not merely in an administrative manner, but if it is connected, closely connected, with a technical enterprise, maybe a Government contracting laboratory, which can, in this way, give a much more solid basis of the judgment of the comparisons between the various kinds of efforts.

I certainly would not like to use the word "wasteful" in describing what has happened in the past. But I am sure that the effort, like all good efforts, can be improved, that it must be improved. And I would like to repeat what I have said before. Our efforts in rocketry have been excellent and improving. The only trouble with it is that the Russian efforts are better.

COOPERATION WITH OUR ALLIES

Senator SALTONSTALL. May I change the subject just a little. I have just been in Brussels, Belgium, and I had a very interesting talk with a general there who is placing scientific contracts for research in France, Belgium, and other countries in Europe, a General Gossett.

You talked about more cooperation with our allies. This program that we have now abroad is a comparatively small program, but it has 181 contracts, I think, now out, and some scientific scholarships.

Do you believe that that is the type of thing that we should accelerate and encourage and enlarge?

Dr. TELLER. This is the kind of seed that will return a hundredfold.

Senator SALTONSTALL. Will you repeat that, please?

Dr. TELLER. This is the kind of seed that will return a hundredfold. There is no cheaper and no better way to spend money.

Senator SALTONSTALL. In other words, you believe that with respect to this cooperation with our NATO countries, we should put more money and more effort into that program?

Dr. TELLER. Most certainly.

PASSIVE, OR CIVILIAN DEFENSE

Senator SALTONSTALL. Now, may I ask you one more question. You spoke of passive defense. Passive defense, as I understand you, is what we have generally in political circles called civilian defense, am I correct?

Dr. TELLER. Correct.

Senator SALTONSTALL. You mentioned two programs which are new to me. You mentioned the program of setting up devices as I understood you, to determine the amount of radioactivity.

Dr. TELLER. Radiation meters, Geiger counters.

Senator SALTONSTALL. Yes, radiation meters.

Dr. TELLER. That is right.

Senator SALTONSTALL. Is there such a meter that is practical that can be put around on a broad scale that people can use?

Dr. TELLER. It is completely practical. It is the same kind of thing that is used, for instance, in uranium prospecting, you see. To learn how to handle such a meter is a matter of 5 minutes. I mean there is no problem about that. There is a problem about mass producing and distributing these meters.

Senator SALTONSTALL. So that our activities there should be on a mass production of something that is already now known?

Dr. TELLER. Precisely. We must get this mass production as effectively and as cheaply as we can. I think the development should be in the direction of making, adapting these instruments to the use of the layman and also getting it so that having millions of these available would not be a serious strain.

Senator SALTONSTALL. Finally, do I understand you to say that you believe that we should concentrate our efforts more on saving people from the dangers of fire than from the dangers of explosives, because the explosives are going to put some of our people out of existence anyway, and that we should try to save them more from the fires that will spread?

Dr. TELLER. That is, in general terms, precisely correct. I think that one can make careful investigation of protection against the blast, too. One should not take that problem lying down, but that is the most difficult one and the one in which probably we will have to postpone action except in special instances where one can make particularly deep and particularly well furnished shelters.

Senator SALTONSTALL. Mr. Chairman, thank you.

POOLING OF SCIENTIFIC AND TECHNICAL MANPOWER

Senator JOHNSON. Senator Kefauver.

Senator KEFAUVER. Thank you, Mr. Chairman.

Dr. Teller, I want to join in congratulating you and thanking you for your very clear and informative testimony, and our outstanding counsel upon the way he has directed your testimony.

My first question is in connection with a question that Senator Saltonstall asked. Remembering that the atomic energy was developed by distinguished scientists of other nations—some naturalized Americans, some citizens of England, Canada, and of the United States—and that we got ahead and had a monopoly on atomic energy for quite a long time—do you feel that in the past 10 or 12 years that in our missile and satellite and other scientific programs we have, to our own disadvantage, erred in not cooperating, working with scientists of other friendly nations more than we have?

Dr. TELLER. I do not know. My general feeling is in the direction of trying to urge more cooperation, and I think that some more advantage could have been had in the past. I have a very strong

and clear feeling that at present there ought to be no hesitation to go ahead with this. I hesitate to a little extent in answering your question definitely by a simple yes or no, for the following reason: Europe, after all, where most of our older help has come from, Europe was very badly shaken up in the years after the war.

In rocketry we are talking about programs of a somewhat massive character, which is not just done by a pair of hands or a single brain. And it is not quite clear to me how soon and how effectively the European countries could have contributed. I think that quite possibly they could have contributed a great deal, and I think it would have been worthwhile to explore this more than we actually did.

However, the main thing to my mind is not the past but the future, and there I have no doubts.

Senator KEFAUVER. I agree with you that we are thinking about the future. Senator Saltonstall and a number of us Congressmen about 2 weeks ago had the opportunity of attending the NATO Parliamentary Conference in Paris. At that time, Senator Jackson, as chairman of a special committee—and he is a member of this Armed Services Committee—presented a report which was worked on by scientists, intellectuals, of this country and others, which was unanimously adopted, calling for the pooling of scientific and technical manpower and for the exchanging of information, for educational programs on a NATO basis generally, and for appropriation of money by the member nations to carry it out.

This recommendation will be before the NATO heads of government in their meeting about 2 weeks from now. Have you had an opportunity of studying this program? Do you recommend it? Or what steps do you think we should take or NATO countries should take to put into effect, to implement the best use of our combined scientific and technical know-how?

Dr. TELLER. Senator Jackson was kind enough to invite me on a group of consultants.

Senator KEFAUVER. Yes.

Dr. TELLER. Which helped him, tried to help him to work out this plan, which has been presented. This group has been unanimous and enthusiastic about the plan, and I agree to it as one of them most enthusiastically. I think it is a wonderful thing to do. It is the right thing to do. I think, however, that events are overtaking us, and quite possibly by now it is not sufficient, even though at the time, a few months ago, or even a few weeks ago when we recommended it, it seemed sufficient.

Senator KEFAUVER. Would you care to indicate the fields you feel should be implemented and enlarged upon?

Dr. TELLER. Well, I would say it placed a great deal of emphasis on the help of educating scientists in the NATO countries. Now, numbers were mentioned, and I cannot quote them precisely, numbers which hoped to increase the scientific manpower in the NATO world by a few hundred a year. Probably more than that cannot be done immediately, but I think that we should begin to think very carefully how to proceed in such a way that this number should not be a few hundred but a few thousand.

Now, you cannot just multiply such a plan by a factor of 10 and hope that it will make sense. You will have to sit down and look at it carefully so that indeed it should make sense; and I think that is

the next step. I also think that some of the problems which I have mentioned, one of them I mentioned, could be taken up as a very special NATO job.

For instance, the question of weather prediction around the Atlantic basin could be a good basis for NATO cooperative and scientific effort. I think that in oceanography we have in this country two excellent laboratories which, however, operate on a shoestring, Woods Hole and Scripps on the Pacific coast. I think in this extremely promising field of oceanography we might establish active cooperation with our allies. I am sure there will occur many other instances of this kind.

INTERSERVICE RIVALRIES

Senator KEFAUVER. One final question, Dr. Teller. You have stated, as we have heard frequently, that interservice rivalries are a good thing if not carried too far, but that in connection with the scientific and missile and satellite programs, that there has been too much tendency for each service and even different units in a particular service to keep and protect and zealously guard the information they have and not pass on new developments to someone else.

Has that been one of the substantial deterring factors in our progress, and if so, how would you eliminate it? What kind of mechanism would you suggest to have better coordination?

Dr. TELLER. I think that one certainly should have the maximum possible amount of exchange and cooperation. I suspect, and I am not close enough to the field to be able to assert it, but I suspect that already quite a bit of cooperation exists. I can cite you an example. A short time ago I was invited to chair a meeting in which representatives from various industries were invited to make proposals, and there was some worry that they would protect their particular company secrets and wouldn't talk out, and some thought was given to the idea that each of them should report to the investigating group separately.

Well, some of us made the proposal this is evidently not right, these people should be in exchange with each other, they should stimulate each other. Let us ask them to talk without restraint in each other's presence. We asked them. They had no objection. The meeting went on, and if I am any judge of what happened, it was completely clear that these people liked it and did it. I suspect that there has been already in the past many cases where the technical people involved in the various competitive enterprises did their best to cooperate. I think this must go on and must be strengthened. I think it will. I do not think that the situation in the past has been bad, but I do believe that it can be improved, and I think through a coordinator and by stimulating exchanges this can and will be done.

Senator KEFAUVER. Thank you very much, Mr. Chairman.

Senator JOHNSON. Thank you, Senator Kefauver.

Senator Flanders.

RUSSIAN PROPAGANDA. MISSILE PROBLEMS: PROPULSION, DIRECTION, REENTRY

Senator FLANDERS. I would like to join, sir, in saying that this has been—I will put it in the superlative—this has been the most stimulating witness, Mr. Chairman, that has ever come before this committee in my membership on it. That is a superlative statement.

Now, as I understood you with reference to what we know about the launching of the satellites and their connection with the intercontinental ballistic missile, we may say that the Russians have solved the problem of propulsion?

Dr. TELLER. Indeed.

Senator FLANDERS. If I understood you, we may assume that they have solved or soon will solve the problem of reentry?

Dr. TELLER. Right.

Senator FLANDERS. You expressed, as I remember it, a lack of knowledge as to whether they had solved the problem of direction so far as being able to put a missile on a target is concerned.

Now, I would like to ask whether there is any validity to this point? We are considering the ICBM as a military missile. We therefore require the greatest refinement in direction that we are capable of devising. Does the Russian Government, the Soviet Government, necessarily need that great accuracy of direction if it considers the weapon as a political weapon of terror rather than a military weapon.

Dr. TELLER. I believe that there is clearly validity in an argument of this kind. I would, however, like to add to it, I believe that the development of accuracy, while difficult, is not extremely difficult. I think that this development is almost certainly taking place in such a broad and well-founded effort as we have seen the Russian effort to be.

Futhermore, accuracy of delivery can be extremely valuable to anyone, for most obvious reasons. For instance, it makes the possibility of retaliation very much harder if they have a very rapid and very accurate weapon. I would say that the overwhelming probability lies with the statement that the Russians either have developed or are going to develop accurate guidance, and certainly we should, in commonsense and in order to insure our safety, assume that this is likely to be so.

Senator FLANDERS. The point I was trying to bring out was this: that while from the Russian standpoint accuracy of guidance is a very strong requirement, yet the very fact that they can get a missile to England, on to the United States, on to any place they wish to, just get it into that country, is a tremendous political asset on their part even though they never send it?

Dr. TELLER. This is obviously true.

Senator FLANDERS. So that they with political purposes and terror purposes in mind now have an instrument probably toward which we are not directing our development and do not wish to direct our development, that is, we are not interested in starting pure terror. We are interested in reaching a military target.

Dr. TELLER. This is correct. Also, one should say that our work on guidance, as far as I know, does not interfere with our work of propulsion. I don't think that we need say at all that our work on propulsion has suffered because we have overemphasized guidance.

Senator FLANDERS. Now, a technical question. Let us suppose that we send up an atomic or a hydrogen warhead on a long-range missile, or let us suppose that the Russians do. Supposing the reentry problem is not solved and that warhead burns up as it comes down through the atmosphere. Does that explode it?

Dr. TELLER. I did not hear the last word.

Senator FLANDERS. If it burns up coming down through the atmosphere, does that fact explode the atomic or hydrogen warhead?

Dr. TELLER. It can be so arranged that an atomic or hydrogen warhead is exploded on reentry. If it is not so arranged, then, of course, the warhead is destroyed.

Now, I should like to say that if the warhead burns up, there is, I think, every probability that it will burn up so high in the atmosphere that the exploding atomic or hydrogen warhead will not cause any serious damage.

PHOTON PROPULSION

Senator FLANDERS. That is really a matter of interest that I raise that question, but I presume it has some practical aspects.

Now, the Russians, some Russian scientists, have been giving out statements to the papers about photon propulsion. Is that just hogwash or is there a scientific possibility there? I do not want you to get into the position that Lord Rutherford was in so many years ago, but what do you think? Is photon propulsion anything or not anything?

Dr. TELLER. I would like to say that I should have been honored to be in the same position and to be mentioned in the same sentence with Lord Rutherford, and I am sure that I will make worse mistakes than he made at that time.

I would like to say this: I do not know of any scheme along the direction of photon propulsion that makes sense. The idea of photon propulsion just in this simple, blunt way is something which occurs very easily. Its feasibility might be quite difficult. In the various possible applications of nuclear rockets, in rocketry, I should like to make this statement: That we probably will need nuclear propulsion if we want to explore the planetary system.

With or without nuclear propulsion, I am sure the planetary system can be explored, and nothing like photon propulsion, even if it is possible, is needed. However, when you want to go to the next star, which is so distant that light takes 4 years to get there, then you have to get rockets which really move fast; and with the best nuclear propulsion that I can imagine today, it will still take more than a hundred years to get to that next star, and that is a bit on the longish side for a journey. Really exotic methods of propulsion might have to be devised, will have to be devised to get there. How it will be done, I don't know. Whether it will be done, I am not quite certain. But I would bet it can be done either by something like photon propulsion that I have heard about, but do not understand, or by some other means which I also do not understand and have not even heard about. [Laughter.]

Senator FLANDERS. Of course, there is an alternative on this 100-year expedition, and that is to man the ship with an expanding population.

Dr. TELLER. That possibility might indeed exist.

DEFEAT WITHOUT WAR

Senator FLANDERS. Now, one last question: You suggested that we might be defeated without war, and gave a single instance which was that of Russian control of the weather.

Dr. TELLER. Yes.

Senator FLANDERS. Which left us high and dry. Have you any other possibilities in mind of that defeat without war?

Dr. TELLER. I would like to suggest another one, although I am pretty sure that the number of examples can be multiplied. I should introduce it by saying that to try to predict scientific developments is a real hard job because science generally is the activity in which the unexpected is the almost regular thing to happen. It is probable that none of the special examples I give will come to pass, but something similar might. I would like to give another example. Consider, for instance, applied oceanography.

EXPLORATION OF THE SEA

Consider exploration or more general utilization of the minerals at the bottom of the sea. Oil is, of course, the best known. We know that we are exploiting oil near our shores to a limit of 3 miles or 15 miles or whatever it is. If you go out from a continent, the sea deepens rather gradually for a distance of 50 miles, 100 miles, 200 miles. This relatively shallow region in the sea, as you probably know, is called the Continental Shelf in a rather descriptive manner. Beyond that, the sea starts deepening quite rapidly and that is what is called the abyss.

According to our present knowledge, there cannot be expected a great mineral wealth in the abyss, although that knowledge might be mistaken. But there is every reason to expect quite a bit of mineral wealth on the continental shelves. What if the Russians begin to exploit the richness of these continental shelves all over the world? International law still says that sovereignty extends to 3 miles or, at most, 15 miles out to sea. If they just beat us to the techniques, they can be all over the world doing this exploitation.

There is another field also in the sea. We have so far fished in the sea but we have done very little to care for the plant and animal life in the sea. We have developed agriculture. We have not developed "mariculture." What if the Russians begin to cultivate the oceans, find ways to breed fish, protect these fish, and then tell the Japanese, "Come in and fish with us under certain very agreeable conditions"?

Senator FLANDERS. That is H. G. Wells, purple algae. I do not know whether you know that or not.

Dr. TELLER. I am an enthusiastic reader of H. G. Wells, and, in fact, it is practically the only science fiction I read. However, I do not remember the purple algae.

Senator FLANDERS. That is all, Mr. Chairman, and thank you.

Senator JOHNSON. Thank you very much, Senator Flanders.

Dr. Teller, the committee will take a recess until 2:30, at which time we will resume the questioning and Senator Stennis will be followed by Senator Smith, Senator Symington, Senator Case, Senator Bush, and Senator Barrett in that order.

We will recess until 2:30.

(Whereupon, at 1 p. m., the hearing was recessed, to reconvene at 2:30 p. m.)

(Also present, in addition to those present at the morning session: Senator Wiley.)

Senator JOHNSON. The committee will come to order.

For the information of the press and radio and television people, and the photographers, all of whom have been so cooperative with the

committee, I should like to announce we do not plan an evening session today. We do not plan an evening session on Tuesday.

It is very likely if we have not concluded with the witnesses we now have scheduled, that we will have an evening session on Wednesday.

I should like you to have as much advance notice as possible. As soon as that is definite, I will inform you.

TESTIMONY OF EDWARD TELLER—Resumed

Senator Stennis, will you proceed with the questioning?

Senator STENNIS. Mr. Chairman and Dr. Teller: Dr. Teller, I want to add my word of appreciation to you for your splendid testimony this morning, and also say that I think the American people not only are assured by your knowledge and suggestions, but also by your fine sense of humor, coming from a gentleman so learned in the sciences who contributed so much to many programs, including the hydrogen bomb.

Now, one thing that I want to direct your attention to was your emphasis on what could be done. I believe what you listed first was to be certain about our SAC defenses, Strategic Air, and the next was that you said we could accelerate as well as expand our missile program.

UNIFIED AUTHORITY TO CORRELATE PROGRAM

And in connection with that, you said that we needed someone who could go into the programs that are already being done in an excellent manner, and pull them in together or correlate them and pool their efforts.

Were you referring there to someone who not only has the ability to correlate these programs, understand them, but someone with the authority to say which ones would proceed; in other words, someone with unified control, with authority to act? Were you referring to that?

Dr. TELLER. Yes, sir; I was referring to that. I understand that this is already being done. I would certainly hope that this power will be exercised——

Senator STENNIS. Yes.

Dr. TELLER (continuing). In a gradual and increasing way, and also I hope that it will be mostly used to direct the efforts in the most fruitful way, rather than saying which one should proceed and which one should stop, because I believe that in a great many fields, valuable work has been done. And I, of my own knowledge, which is very limited, would certainly not suggest that any of the efforts that went into the rockets has been a waste.

Senator STENNIS. Yes.

But you are firm with the idea that, even though such a unified control or correlation could not be done abruptly, it should be done by all means?

Dr. TELLER. That is my—that would be my suggestion.

Senator STENNIS. Do you not think that the person who is charged with that responsibility ought to have the power and the authority to say what should be done and the authority to put that project through?

Dr. TELLER. That is what I would hope, and I would hope that such authority should be at first exercised with quite a bit of discretion, and later perhaps more fully.

Senator STENNIS. Yes.

And that authority to see this decision through, it should include the authority even to go over the Department of Defense, if necessary, or should be authority that would go over the Budget Bureau, if necessary; is that not true?

Dr. TELLER. I feel, sir, that I have too little experience in organizational matters. When you mention the Bureau of the Budget—

Senator STENNIS. Correct.

Dr. TELLER (continuing). You, of course, have not mentioned a very popular bureau at this very moment.

Senator STENNIS. Yes. I understand. You would not want to go into that phase of it.

But you unqualifiedly said there must be a unified authority with power to act.

Dr. TELLER. That seems to me commonsense.

Senator STENNIS. From the standpoint of a scientist.

Dr. TELLER. This seems to me commonsense, not from the standpoint of a scientist, but just plain commonsense.

Senator STENNIS. Do you know of your own personal knowledge whether anyone has actually been authorized yet to exercise this power or this control that you speak about?

Dr. TELLER. I understand that this has been done, but my experience in administrative matters is much too limited to understand whether it has been really done or not. I mean that goes way beyond my knowledge and my experience.

Senator STENNIS. You have not checked into it to know?

Dr. TELLER. I certainly did not.

SHARING SCIENTIFIC KNOWLEDGE, UNITED STATES AND ALLIES

Senator STENNIS. One other question now.

You spoke this morning about sharing scientific knowledge. I do not just know that I remember all the points you made, but I want to know, you were talking about sharing knowledge as between scientists of this country and also scientists of other countries.

Would you enlarge on this: Has there been any lack of sharing scientific knowledge as between those working on these various missile projects? Take that part of it first. Were you referring to any weakness that you know of through the lack of correlation or sharing of knowledge on this missile knowledge?

Dr. TELLER. My understanding is, there has been sharing of knowledge, but also that it has been within the United States less than complete.

Senator STENNIS. Less than complete as between the groups working on our different missiles?

Dr. TELLER. This is my general understanding.

Senator STENNIS. Yes.

Dr. TELLER. But I may easily be mistaken. I am not sufficiently familiar with the details.

Senator STENNIS. All right.

Coming, then, to your suggestion on sharing this knowledge, would that involve through treaties and NATO or organizations of various kinds? Was that your reference?

Dr. TELLER. This would be my understanding. I am quite sure that if you want to share secret information, then you will certainly want to discuss first carefully in what way secrecy should be guaranteed on the level of, let us say, NATO or some other form of treaty. And I am quite sure this has to be threshed out in detail, and secrecy is a difficult question every time, and it will fit into every country's functioning in a slightly different manner.

So I am quite sure we are raising here questions which will have to be considered, but I feel that one should try to overcome these difficulties, and through treaties, through discussions, get to a point where we can effectively and with a minimum danger share our secrets.

Senator STENNIS. We will have legislation recommended to us, probably, for the sharing of this scientific knowledge, and I would like to have the benefit of your observations on it, was the reason I was asking these questions.

So when you recommend that the sharing of this knowledge be had, it is subject, of course, to these safeguards that you have just referred to, and some kind of plan as between international organizations; is that correct?

Dr. TELLER. That is correct.

Senator STENNIS. Well, I thank you, Mr. Chairman. I believe that is all the questions I have.

Senator JOHNSON. Thank you, Senator Stennis.

Senator Smith?

Senator SMITH. No questions, Mr. Chairman.

Senator JOHNSON. Senator Symington?

Senator SYMINGTON. Dr. Teller, I join with all those people who have complimented you on your magnificent testimony this morning.

The evenings that you and I have spent together in Washington, Missouri, and California have had much to do with forming my own opinions, and I think it is very fine for you to come up here and be such a lucid, intelligent witness on what may well be the most important subject we have to deal with today.

RUSSIA WILL HAVE BEST SCIENTISTS IN 10 YEARS

I would like to ask a few questions, if I may.

Fairly recently, you said that—

Ten years from now, the best scientists in the world will be found in Russia. I am not saying this will happen unless we take this or that measure. I am simply saying that it is going to happen.

That is a pretty pessimistic view. Would you comment on it at this time?

Dr. TELLER. Well, I said this, and I would be—and I repeat it. I believe that this is what we have to expect. I said it essentially for two reasons:

One is the observation which I have made here repeatedly, that Russian science has been catching up with us at such a rate that where there was a great difference after the war, there is not much of a difference now; and if there is one, then one is not quite certain in whose favor.

Therefore, just extrapolating the strength in a very simple-minded fashion, one would expect this disagreeable thing to happen.

I also would like to say it for the following reason: I believe that in science, young people make probably a greater contribution than in other fields, proportionately greater contribution.

BETTER SCIENCE EDUCATION

Now, from everything we were able to find out from behind the Iron Curtain, it seems clear that the young people in Russia, let us say between the ages of 10 and 20, have a considerably better science education than the similar age group in this country.

Ten years from now, these young people will carry the burden of science in Russia and in our country, and, therefore, since they are better prepared, I feel that it is a foregone conclusion that they will do the better job.

I therefore think if one looks at the situation realistically, one must not say that we ought to retain leadership in science, but rather, that we should do everything in our power to regain that leadership.

Senator SYMINGTON. Thank you, Dr. Teller.

TO SUBMIT EDUCATIONAL PLAN

Have you ever presented in detail, any educational plan? If not, do you think you can furnish for the committee records what you believe we must do in our effort to catch up, from the standpoint of education?

Dr. TELLER. I have never done this, and if I should be asked to do it, I will try my best, because I dare not refuse the challenge.

I believe that it is a very difficult assignment, and I would be a little more confident about my diagnosis than I would be about any cure which I can propose.

Senator SYMINGTON. Will you consider this as a personal request?

CORDINER REPORT

Have you heard about the Cordiner Committee report, the Cordiner Committee?

Dr. TELLER. I heard about it, but I am not familiar with it.

Senator SYMINGTON. The report says that if we spend around a half billion dollars now, within 5 years we will save over \$5 billion a year. Of course, all of us want maximum defense at minimum cost.

HOLDING TRAINED PERSONNEL

What are your further thoughts, because you dwelt on it at some length this morning, about the importance of getting trained people, and holding trained people, in the Military Establishment?

Dr. TELLER. I believe that perhaps to add to what I have said, that in the minds of our own scientists there has been too great a distinction, too great a separation between academic work and work for practical use, particularly work for the Military Establishment.

I think that the present urgency which has been created by the Russian ICBM and sputnik will help in this situation.

I also believe this: That not for all people, but for quite a number of people, perhaps for the majority of the scientists, it is a healthy experience to spend some time at a university in pure research, then maybe go into military work, and then maybe come back to the university work.

The tools are similar, the intellectual activity is similar. The distinction between the two kinds of work appears greater than it is. The broader experience that one gets by varying one's occupation to this extent, I think, is really beneficial in many cases to the scientist himself. I have seen that in explicit personal examples.

Senator SYMINGTON. Thank you, Doctor.

DIFFERENCE BETWEEN ROCKET EFFORTS

You mentioned this morning you thought our rocket effort was good, but that the Russian effort was better.

Would you expand in any way on what you think we should do to make our missile effort at least equal to the Russians?

Dr. TELLER. I think we should speed it up, I think that we should diversify it, particularly by undertaking now more research-type work, the type of work which is in the \$10 million to \$50 million per year class.

I think that these research efforts should be directed toward preparation for the next step beyond the immediate military goal, toward the next generation of rockets beyond our first IRBM and ICBM capability.

I think, furthermore, that this research effort should be directed toward satellites and toward space exploration. In this field of research sputnik has made the recruiting problem a particularly easy one.

Immediately after sputnik quite a few of my younger colleagues came to me and asked me, "How can I help?" and in most cases my only answer is, "Wait and store up your enthusiasm for a few more weeks until we find out how you can help."

IMPORTANCE OF MANNED BOMBER

Senator SYMINGTON. Now, you mentioned the question of the importance of SAC's capacity for retaliation.

Since sputnik, we have had a great many pages about ballistic missiles, and other weapons of the future, in the press.

But we have not had very much about the importance of existing forces; and inasmuch as we both know we won't have ICBM's operational for some years, if we are forced into defending ourselves, of course, we must use existing forces.

As I understand it, you are not one who thinks that today, or for years to come, the manned bomber is obsolete. Is that correct?

Dr. TELLER. I am convinced that the manned bomber is not obsolete now, that we need to rely on the manned bomber for retaliation during the time in which we do not have a real rocket capability.

I hope that this time can be made short by a determined effort. But I furthermore believe that even after we get a rocket capability, the manned bomber still will not be obsolete.

A rocket can hit a target, of which you know. A bomber can fly out and look for the target, for targets which you may not know of

right now or whose location is not exactly available or even targets of opportunity.

For instance, in limited warfare situation like Korea, you are trying directly to assist your own operations and to attack some enemy concentrations or enemy positions. You should do this with a weapon which does not merely have a fist but also eyes.

Senator SYMINGTON. Thank you, Doctor.

RUSSIAN PROGRESS IN MISSILE PROBLEMS

This morning, as I got it, you said you believed the Russians have solved the guidance problem, the propulsion problem, and the reentry problem. Is that correct?

Dr. TELLER. The way I would like to put it is this: It is quite possible that they have solved all of these problems, and it is the safe assumption on our part, an assumption which we have to make for our own safety, that indeed they have solved these problems.

I would say that we do not know that they have. What we know is that they have solved the propulsion problem and they have made a very considerable step toward solving the guidance problem.

I believe that in case the assumption that they have solved all three problems is mistaken. I have little doubt that what remains to be done they can do in a rather short period.

Senator SYMINGTON. Thank you, Doctor.

UNITED STATES SURPRISED AT SPUTNIK

A recent article stated you said the Soviet sputnik came as a shocking surprise to the United States public, but was no surprise to United States scientists. Do you remember that?

Dr. TELLER. Yes, sir.

Senator SYMINGTON. And then this morning you talked about closing the gap between the scientist and the common man.

INFORMING THE PUBLIC

My final question is, Do you feel there is considerably more information which could be gotten out in this field that would not help the possible enemy, so that the public would know more about these matters?

Dr. TELLER. I am not sure. In the particular field of military-type information I would not like to assert it with conviction. I have not thought about the question sufficiently. I would believe that it would be possible, healthy, useful, better to inform our public about the precise military position in which we find ourselves, because I am sure that ultimate decisions go back to the public and therefore it is absolutely necessary that they may be well informed indeed.

Senator SYMINGTON. Let me rephrase the question this way:

You say sputnik was no surprise to the scientists.

Do you feel that public opinion, the American people, could have been prepared for it more than they were, without at the same time giving away secrets?

Dr. TELLER. I would think that the answer is "Yes."

I am afraid when I said that sputnik was no surprise to the scientists, perhaps I have overstated the case.

It was no surprise to some scientists, and generally it was a lesser surprise to the scientific community, a considerably lesser surprise, than it was, as far as I can judge, to the public.

Senator SYMINGTON. Thank you, Dr. Teller.

Thank you, Mr. Chairman.

Senator JOHNSON. Thank you, Senator Symington. I may say this concludes the questions of the members of the subcommittee.

We have Senators who are members of the full committee and we are anxious to have them participate as fully as possible.

I would like to welcome in the room the distinguished former chairman of the Committee on Foreign Relations and the ranking member of the Committee on Foreign Relations, Senator Wiley. We are glad to welcome you, and if you would wish to ask some questions after the members of the committee do so we would be glad to have you ask them.

Senator JOHNSON. Senator Case?

Senator CASE. Thank you, Mr. Chairman.

Dr. Teller, I want to add to what has been said about the admiration of your testimony given at this hearing.

The first question I want to ask relates to the matter of an actual testing.

You stated this morning that we could not hop along on the theoretical side of development or research that an actual testing was necessary.

DETECTION OF RUSSIAN MISSILES

Having that in mind, is it beyond the present capabilities of our receptive devices for the Russians to test an intercontinental ballistic missile without its being known and detected by us?

Dr. TELLER. I do not know. I think that this is a highly technical question. I am of the general opinion that when you are trying to hide something, you have an easier job as compared to the position when you are trying to detect something.

There are all kinds of ways how, if you try to hide your activities, you can succeed. But it is a game played with great skill by both sides, and I would say that while detection is possible, that it certainly is not a cinch.

Senator CASE. But the principle you stated with regard to the necessity of making an actual test would apply to the Russians as well as to us.

Dr. TELLER. May I ask, I did not quite clearly understand: Are you talking about rockets or about nuclear explosions or both?

Senator CASE. Well, whatever would be involved in the production of an operational ICBM?

Dr. TELLER. I would like to answer the question, whether the Russians need testing in the following way: Generally, testing is a very necessary step and I should say it is a necessity on their part also.

However, there is a little evidence that we have been a little more conservative than the Russians, and that they are willing to take perhaps somewhat longer steps, if need be.

This is my impression and it need not be a correct one.

Senator CASE. Thank you.

STRATEGIC AIR COMMAND

The second question I wish to ask has to do with the maintenance of the capabilities of SAC.

You placed that first in the list of five things you mentioned in response to the chairman's question, and I assume you gave that high priority.

Did you have in mind anything particularly in connection with the SAC organization that gives you concern at this time?

Dr. TELLER. I know too little about organizational questions. I have, on a number of occasions, visited the SAC headquarters, and I have the greatest admiration for the way they are running their business, and I think that their organization is fine.

At the same time I am sure that their operations can be improved to a great extent by giving them enough money to do the things which they had been advocating for some time.

Senator CASE. I did not want to lead your answer in any respect, but I was wondering if you had reference to the matter of the dispersal of the planes accorded to SAC?

Dr. TELLER. I think that the dispersal of the planes is probably the most, I would say is the most, reasonable first step to take. I may have misremembered, but I thought I had mentioned that already; I did not give this answer right away, because I did not realize that this was within the realm of your inquiry.

Senator CASE. Thank you.

WEATHER CONTROL

The third question I wish to ask relates to the thing you mentioned when you were talking about a long-range picture, and that was the possible study of weather control by the Russians, implying, I would assume, thereby, that we ought also to be concerned about possible weather modification or control. You referred to smog as giving you some reason for thinking that there might be something in weather modification.

Dr. TELLER. Excuse me; I referred to a subject which you quoted and which I did not identify.

Senator CASE. You did not identify it?

Dr. TELLER. I am sorry; I did not understand you.

Senator CASE. I thought you referred to smog as giving evidence of the possible effect.

Dr. TELLER. Smog—s-m-o-g. I don't think I referred to that at all.

Senator CASE. Did you have anything specific in mind? Do you have any knowledge of Russian activities in this field?

I might say that the reason I ask this question is that, as you probably know, we have had the Advisory Committee on Weather Control, which is about to conclude its studies and report to the Congress by the end of December.

The Senate has already passed the bill to authorize the National Science Foundation to carry on a program of research in weather modification. The bill is now pending in the House.

In view of your references to the possibilities of weather modification or control by the Russians, I was wondering if you could elaborate

on that and, perhaps, give us the benefit of any opinion you have or any knowledge you have of their work in that field.

Dr. TELLER. I cannot say more, I have no more knowledge. I mentioned this subject as one which might become very practical. Much more intensive work on weather prediction is the main thing which I would be interested in, because I believe that, eventually, it will lead to the possibility of weather modification.

Senator CASE. And you would regard any study that would—any basic research that would give us greater knowledge in the prediction of weather or the possibility of modification of it as worthy of attention by the Congress.

Dr. TELLER. I would consider that as most worthy, very definitely; yes, sir.

Senator CASE. Thank you very much.

Mr. Chairman, I hope, if there is something in this field, that we may pursue it so that we are not left high and dry by the Russians claiming all the rain.

Senator JOHNSON. I know of the Senator's great interest in this particular field. I have cooperated with him on measures that have passed through the Senate, and I appreciate very much the interest that has been demonstrated here.

Senator BUSH?

Senator BUSH. Mr. Chairman, I have no questions, but I do want to join with the other Senators in complimenting Dr. Teller for a very splendid presentation today.

Senator JOHNSON. Thank you, Senator Bush.

Senator BARRETT?

Senator BARRETT. Thank you, Mr. Chairman.

Dr. Teller, I am at the bottom of the totem pole of this committee, so I will be very brief. I know you have been very kind here in testifying before the committee, and I want to join with all my other colleagues in congratulating you on the fine presentation you have made on this problem.

EXPAND AND ACCELERATE MISSILE PROGRAM

As I understand, Dr. Teller, you intimated this morning that we might expand or accelerate our missile program by utilizing other scientific capabilities which are available in this country, and I was wondering if you were referring to companies that work in that field or to individuals.

Dr. TELLER. To both.

INTERESTED COMPANIES

I had primarily in mind the possibility of drawing into the effort additional companies which have demonstrated or can demonstrate their ability, and which are not now involved in other really essential work.

INTERESTED SCIENTISTS

At the same time, it is certainly true that among our own scientists there is a great wave of interest in this field, which has not occupied their minds so far very greatly.

Many of them would welcome the possibility to make a contribution at the present time, would be happy to go into practical work where previously they had been interested only in basic work. Now, I think that some of these who have a desire to, I should say all of these who had a strong desire to contribute, should be encouraged to contribute, and I believe that you will have no shortage of people who try to help.

Senator BARRETT. Well, I certainly agree with you, Dr. Teller. Would you say the reason they have not been utilized in the past has been because of the fact that there have not been funds available?

Dr. TELLER. I think the plain reason is that the situation overnight has become so dramatic. Our attention has been drawn to this. Many of these people, young people, have enjoyed their usual normal and basic work, so that contributing to another field, in many cases, would not have even occurred to them.

Now, quite a few of them say to themselves, "This is a serious situation. We can help, or I can help. What can I do to help?" I think it is just the same normal response that you find throughout the country.

Senator BARRETT. I am sure that is true, Dr. Teller. I was wondering if you were suggesting that we put this program on a crash basis, on around-the-clock operation, and call in these other people to help. Is that the idea?

Dr. TELLER. Sir, perhaps yes. But I don't like the word "crash"; it somehow does not have the right implications.

I would like to say let's accelerate and let's be quite careful about the way we accelerate, and then let's accelerate as vigorously as we possibly can.

Senator BARRETT. Well, thank you very much, Dr. Teller.

EDUCATIONAL SYSTEM

There is one other question which has occurred to me. Apparently, our educational system in this country is not up to par, as far as Russia is concerned, in training our young people in this scientific field. I was wondering if the fact that their armed services are training a lot of these young boys who come into the different branches of the service compensates in any degree for the fact that our school system has not taken hold.

Dr. TELLER. I think that the contribution from the armed services to the educational situation is very welcome, but I do not think that, in the particular connection in which I am making my suggestions here, you need to have that in mind.

Our greatest shortcoming is not at the university level, but it is at the levels of elementary education and high school, and the Armed Forces get into the level of the more mature people, of the university people.

Now, improvement on the university level is important, too. I certainly would not like to appear ungrateful for the way in which the Armed Forces have contributed to our work.

But I should say that when you talk about educational systems, the decisive battles will be fought in a field where the Armed Forces cannot contribute, because we are concerned here with youngsters who are not yet ready for the Armed Forces.

Senator BARRETT. Thank you very much, Dr. Teller.

Thank you, Mr. Chairman.

Senator JOHNSON. Thank you, Senator Barrett.

Senator WILEY, any questions?

Senator WILEY. Mr. Chairman, I feel flattered, I have not heard most of the testimony.

I don't know what fields he covered this morning but I am sure that I can read the testimony with profit.

Senator JOHNSON. So do I.

Counsel, do you have any additional questions?

Mr. WEISL. No, sir.

Senator JOHNSON. Senator Saltonstall?

Senator SALTONSTALL. No questions.

Senator JOHNSON. Senator Kefauver?

EXCESSES IN SECURITY SYSTEM

Senator KEFAUVER. Mr. Chairman, if I may I would just like to ask one question and Dr. Teller may not want to comment on it.

I have felt some of the excesses in connection with our security system, some of the attitudes of Congress in connection with investigations, and even confirmation of appointees, may have discouraged young people from seeking Government employment in scientific fields, may have even discouraged people from taking up scientific careers.

You don't have to express yourself about it if you don't want to of course, but if you have any comments I would like very much to know how you feel.

Dr. TELLER. Senator Kefauver, this is obviously a very difficult question, and I hesitate to answer it because it is so difficult.

I would like to say this: Certainly excesses in security proceedings are very harmful.

In the particular field which I could observe, namely, in the application of clearance procedures within the Atomic Energy Commission, I have had plenty of evidence that the security rules, which of course by their very nature are painful, have been applied conscientiously and with discretion, and I want to talk only about the Atomic Energy Commission's work, because this is the only one where I had any experience.

I also would like to say this: when one has a situation where secrecy and security are necessary, that is in itself a handicap, and we should recognize it as a handicap, and understand that secrecy has a value, and we will have to pay some price for it.

I should think that you are right that some people, some young people have been frightened away from scientific careers because they heard about such excesses.

I cannot comment and should not comment here about actual examples of such excesses, but I am sure that the great majority of the people who have been connected with security work have done their very best to avoid such excesses, and furthermore, too much talk about that subject in itself frightens people away, because there can be an excess in criticizing the excesses.

Senator KEFAUVER. Thank you, Mr. Chairman.

Senator JOHNSON. Senator Flanders?

Senator FLANDERS. No further questions.

Senator JOHNSON. Senator Stennis?

Senator Smith?

Senator SMITH. Mr. Chairman, I would like to make an observation.

WEATHER CONTROL

Dr. Teller, I was most interested in your observations about the potentialities of Russia effecting weather control.

Two years ago, about this time, I was in Moscow, and visited the agricultural fair and exposition there.

I saw a series of lighting effects and scenic staging portraying what the Russians claimed they could do in the line of weather control in changing, converting frigid barren areas into tropical areas.

I discounted it, thought it was somewhat exaggerated.

I have quite changed my mind at this time.

I would like to ask you from what you have said, in your opinion, do you think—how soon do you think the Russians can make it difficult for us with their weather control plans?

Dr. TELLER. Senator Smith, this, of course, I cannot answer. To influence the weather is merely a possibility.

I would be much more confident about getting to the moon or to the planets than influencing the weather.

But, nevertheless, influencing the weather is a possibility.

Now, the second reason why I don't know how to answer your question is that of course I am quite uninformed about the special things that the Russians are doing.

I merely try to point that out as a general field in which exceedingly important work can be undertaken, and I would guess, and that is a very, very poor guess, that the Russians are undertaking it.

I must say that I personally would not be surprised if in a short time like 5 years they would succeed in doing something quite substantial. I would also not be surprised if I would live for 50 more years, and even by the end of that period nothing would have happened.

It is a possibility that is with us, and it may take a short time or it may take a long time or it might be effectively impossible, although my guess is always that it is possible.

Senator SMITH. Thank you, Mr. Chairman.

Senator JOHNSON. Have you concluded, Senator Smith?

Senator SMITH. Yes.

Senator JOHNSON. Senator Symington?

Senator SYMINGTON. Mr. Chairman, I have several more questions.

MISSILE LAUNCHING SUBMARINES

Dr. Teller, we have heard a lot about SAC today. Some of us are worried about the fact that, according to testimony, the Soviets now have around 10 times as many submarines as the Nazis had when they started World War II.

From your own knowledge of the military problem do you believe these submarines including their missile potential, are a possible menace to the security of the United States.

We know we have submarines that can launch missiles.

Therefore, following your general line of thinking, and from the technological aspect, our assumption should be that they have too.

We talk a lot about the Air Force. How about this problem?

Dr. TELLER. I think a missile-carrying submarine is a menace and a grave menace.

Senator SYMINGTON. Thank you, Doctor.

SOVIET ACADEMY OF SCIENCES

There is a book put out by the Stanford University Press given to me by Mr. Peek, former head of Standard of Indiana and President Sterling of Stanford University at a dinner to Mr. Herbert Hoover recently. It is called the Soviet Academy of Sciences. Are you acquainted with this book compiled at Mr. Hoover's library?

Dr. TELLER. I am not, sir.

Senator SYMINGTON. In the first part it says that this Russian academy, in 1950, was 225 years old; that that in the middle of 1949 it had 20,100 people working, of which 6,053 were scientific workers. That its research was carried out with 6 institutions, 15 laboratories, 4 observatories, 7 museums, 7 stations, 51 committees and commissions. It had 16 branches, dispersed throughout the country, including 4 institutes.

It also served as an official agency entrusted with the task of coordinating and guiding the work of the 12 academies of sciences of individual Socialist Soviet Republics.

Today it says the academy has made its influence felt in the highest scientific organizations of all countries large and small which find themselves under Soviet political domination.

Presumably that was the type and character of functioning you were referring to when you stated that all of this advancement in recent years did not come from the Germans. Is that correct?

Dr. TELLER. It is correct. The academy to which you are referring is known to be an extremely powerful institution and one that is most vigorously alive.

Senator SYMINGTON. Here is an Academy of Science that was formed and operating many years before this country itself was formed. It gives a list of the academy members. Under the 40 or 50 members listed as physicists the oldest one is 1920, Mr. Ioffe.

OUTSTANDING SCIENTISTS

Dr. TELLER. Ioffe.

He is a very well known man.

Senator SYMINGTON. And his specialty was cosmic-ray energy electronics and molecular physics just after World War I.

Right under him is Mr. P. L. Kapitza, who got his membership in 1939. Presumably that is Peter Kapitza.

Dr. TELLER. Right.

Senator SYMINGTON. He specialized in low-temperature physics, properties of substance under the influence of powerful magnetic field at low temperature.

Is it a fair statement to say that Professor Kapitza is a foremost nuclear physicist?

Dr. TELLER. I think that his interest as far as I know has not been in nuclear physics. But I am not sufficiently familiar with his more recent work.

Senator SYMINGTON. Is he the one who spent many years in England?

Dr. TELLER. That is correct. And in England, he worked in the field which you have mentioned, low temperature and magnetism which are extremely important fields.

SOVIETS DEVOTED MANY YEARS TO SCIENCES

Senator SYMINGTON. What I was trying to bring out, Doctor, was that this book would seem to be conclusive proof of the fact that, for a great many years, the Russians have been intensely devoted to the whole problem of physics and the surrounding sciences.

Would you agree with that observation?

Dr. TELLER. I agree with it absolutely and it is quite clear that old and solid support is beginning to pay off.

Senator SYMINGTON. Thank you.

Senator JOHNSON. Thank you, Senator Symington.

Senator Case, any additional questions?

TOO RAPID REORGANIZATION

Senator CASE. Mr. Chairman, I don't have a question but I would like to ask Dr. Teller if he would develop a little bit more the thought he expressed this morning about not rocking the boat by too rapid reorganization of effort.

It happens that with some other members of the committee I recently have been looking at some of the rockets that are presently being developed, and when you made that statement this morning it occurred to me that to throw away some of these that are in mid-stage of development might be quite disconcerting and disruptive so that when you said that this morning, I noted it and I would be glad to have you develop that a little bit in order to give us guidance possibly for recommendations with regard to reorganization, if any, or in what directions.

Dr. TELLER. Well, I do not think that I am the proper person to make a recommendation in any detail.

But I would perhaps like to restate a special case which you might find easy to apply.

DEVELOPMENT OF SIMILAR ITEMS

Suppose that essentially the same object for the same purpose is being developed at two places, and that both these developments turn out to be successful and that indeed there is not much to choose between the two.

You might then try to keep both of these efforts and maintain the spirit in both of them by, for instance, a measure of this kind:

One might be closer to being adaptable to mass production, in which case you might think, or perhaps not you, but the coordinator, the man in charge of these things might find that this weapon indeed should be pushed along as a workhorse in the rocket field.

The other instead might have the advantage of somewhat greater flexibility, less standardized parts.

In that case you might select that as the tool, as the instrument by which we make further advances into satellite and space research.

It would seem to me that such proposals could be quite fruitful. I don't know whether that might serve as a brief illustration.

Senator JOHNSON. Thank you, Senator Case.

Senator Bush?

CONGRESS AND EDUCATION

Senator BUSH. I would just like to go back to one thing, Mr. Chairman, and that is the question of education in the primary and in the secondary schools that Dr. Teller spoke of this morning.

And the very great necessity for stimulating teaching in those schools and in procuring better teachers and holding on to them.

Now, the business of education, as the Doctor well knows, is primarily, if not wholly, at the elementary school level, and the secondary school level, a matter of local or municipal and perhaps State obligation.

Now, have you any thoughts as to what the Federal Government, through legislation here by this Congress, might consider doing to accomplish the things which you say are so necessary and which, I certainly agree that are vitally necessary.

We have got to make not only studying mathematics and science more attractive but the teaching of it more attractive at the elementary and secondary school level and so we can hold these teachers.

As you said, we are not doing it. What do you think that we, as the Congress of the United States, could or should do to accomplish that objective?

Dr. TELLER. As I have said, or tried to say before, Senator Bush; I think the diagnosis is relatively easy and the cure much more difficult.

I know that there are serious considerations whether or not one should go into it—to what extent the Federal Government should concern itself with local problems.

In a very naive and unsophisticated way, without knowing too much about the subject, I would imagine that the kind of legislation which will provide a subsidy for science teaching to be applied under local discretion but with a number of simple rules which will make the subsidy apply only in those cases which have some objective merit, I think such legislation, if drawn up as wisely as you would, probably would be of extremely great help.

However, it is not clear to me what the possible objections and the pitfalls of such legislation may be, and I would feel, I do feel already out of my depth by replying even in this tentative fashion to you.

FEDERAL AID

Senator BUSH. There are some things which the Federal Government does in the way of grants-in-aid to education at the elementary school level, as for instance the school-lunch program.

Now would you think that this was a serious enough matter that the Federal Government might say, well, we will deny assistance to any State which does not insist that the science teachers be given a 10-percent differential over and above what other teachers in the school get.

Is it serious enough to take drastic action like that which would be very unpopular, I am sure in many quarters?

Dr. TELLER. The situation is certainly serious enough. I would, of course, be happier if everybody's salary would be raised, but at the same time, it has to be stated that acute danger, the acute difficulty exists in the special case of the sciences, mathematics, but particularly the science teachers.

Now, I would think, therefore, that such a differential as you mention might be the necessary measure to take, and furthermore, the situation is made more difficult by the fact that as things stand now, I am afraid that a 10-percent differential is not enough.

Senator BUSH. Your feeling then is that whatever leverage the Federal Government might have in this field the situation is so serious as to deserve using that leverage right away?

Dr. TELLER. I certainly hope if such leverage can be made without causing some serious dislocation, I certainly hope that such leverage will be applied.

Senator BUSH. Thank you very much, Mr. Chairman.

Senator JOHNSON. Senator Barrett?

Senator BARRETT. Thank you, Mr. Chairman.

No further questions.

Senator JOHNSON. Any other members have any questions?

Senator FLANDERS. May I make an observation, Mr. Chairman?

TEACHERS' PAY

Senator JOHNSON. Senator Flanders.

Senator FLANDERS. This observation is for the record, and that is that there are high schools in my State of Vermont which are teaching dancing, which are teaching various other of these cultural subjects, which propose to teach skiing, which are teaching automobile driving with a master of arts degree, and I suggest that there is much that can be done on the local level to shift over the emphasis of these supernumerary subjects into basic education and raise the teachers' pay by applying future teachers to more basic subjects, raise the teachers' pay in the process.

ATOMIC ENERGY COMMISSION

Senator JOHNSON. Dr. Teller, I believe you testified that you are a member of the Advisory Committee of the Atomic Energy Commission?

Dr. TELLER. Yes, sir.

CUTBACKS—NUCLEAR ROCKETS AND AIRPLANES

Senator JOHNSON. As a member of the Advisory Committee of that Commission, are you aware of any of the Commission's cutbacks in the efforts to achieve a nuclear rocket and a nuclear-powered airplane?

Dr. TELLER. I know of the subject and the answer in any case would not be a completely simple one as we well realize.

I have the very strong feeling that I should not even attempt to sketch the situation in an open session, but if you require me to do so, I will try to do my best.

Senator JOHNSON. No. I should not want you to go into any matter that you could not go into fully within the bounds of the security rules, and if you feel that you have to violate security in order to answer my question, I will try to rephrase my question.

Dr. TELLER. I would perhaps answer this way: I have been a member of that committee for only a little bit more than a year. During this period some actions have been taken within the Atomic Energy Commission. Just to indicate my relation to these things, and without giving much of objective information, I should say that the conduct of these fields which you have mentioned, has been a wise one, and that—

Senator JOHNSON. Wise, did you say?

Dr. TELLER. Wise. And I would like to say that this is a difficult situation because one has to exercise judgment about the question; whether particular projects are feasible or not. I should also say that the situation as it exists now will certainly need reevaluation. But I do not believe that this need be done in these cases in my private opinion in any drastic fashion.

In other words, I think that if you would want to hear a discussion of these things in closed session I could furnish details and say more in detail what things have been done or not done. My general approach to it would be that I am in agreement, in general with what has been done, because among other things, our advice has been both solicited and by and large accepted. So if I would criticize, I would criticize my own recent judgment.

Senator JOHNSON. And if you were to elaborate in some detail you would probably justify the actions you have taken.

Dr. TELLER. Well, I am afraid that I have to admit that this is one possible way of looking at it.

Senator JOHNSON. Senator Carroll, would you have any questions you would like to ask Dr. Teller?

Senator Carroll, of Colorado, is here and I wanted to ask him if he had any questions.

Do you care to ask any?

Senator CARROLL. No, thank you, Mr. Chairman.

APPRECIATION

Senator JOHNSON. Thank you, Senator Carroll. We are delighted to have you and we hope you will be able to participate in these hearings. All other Senators are welcome.

If there are no other questions of Dr. Teller, I want to make a brief statement.

This committee is indebted to you but that is not so important as the fact that the entire Nation is indebted to you.

You came and told us what we wanted to know. You responded to our questions in the spirit of what should be done.

You laid the facts on the line, and you were careful to qualify your answers on the rare occasions when we wandered outside of your field.

I was particularly struck by one thought which you stressed heavily. It is that missiles will not be produced merely by issuing commands or giving orders, and that even if we could produce them by such means, we would not go to the root of our trouble.

As I understand it, it is your concept that what we need is a broad scientific base from which we can produce not only missiles but all of the weapons which modern technology is opening up to us.

It seems to me that this is a thought which must be pursued vigorously, not only by this committee but by all of the people of America.

Dr. Teller, it is a rare privilege to have the opportunity of hearing a man who is both deeply versed in his field and so capable of expressing his thoughts clearly and forcefully as you have done during the 4 hours of your testimony before this committee.

You have given us valuable information and you have given us thought-provoking ideas.

Our Nation, we all know, is confronted with a serious crisis. For the help you have given and for the contribution that you have made, we, and I mean the whole country, are very grateful to you.

We are mighty glad that you live in our country.

Thank you, Dr. Teller.

Dr. TELLER. Thank you very much, Senator Johnson.

Senator JOHNSON. Next is Dr. Bush.

Will you stand and raise your right hand, please?

Do you solemnly swear the testimony you will give this committee will be the whole truth, and nothing but the truth?

Dr. BUSH. I do.

TESTIMONY OF VANNEVAR BUSH

Senator JOHNSON. Every member of this committee is thoroughly aware of the tremendous contribution Dr. Bush has made to this Nation.

Dr. Bush is an outstanding scientist and outstanding American. I am not going to gild any lilies by paying tribute to Dr. Bush. But for the benefit of the record, I am going to make a very small reference to the contribution of Dr. Bush.

He received his bachelor of science and master of science from Tufts College in 1913 and his doctor of engineering from Massachusetts Institute of Technology and Harvard in 1916.

He has served with distinction in both business and academic fields. Until 1956 he was president of the Carnegie Institution of Washington. He is now chairman of the corporation of the Massachusetts Institute of Technology.

It would take many pages to list his service to our Government. He was Chairman of the National Advisory Committee for Aeronautics from 1939 to 1941. He was Chairman of the National Defense Research Committee in 1940-41. He was Director of the Office for Scientific Research and Development from 1941 to 1946.

He was Chairman of the Joint Committee on New Weapons and Equipment of the Joint Chiefs of Staff from 1942 to 1946. He was Chairman of the Joint Research and Development Board from 1946 to 1947.

He was Chairman of the Research and Development Board of the National Military Establishment from 1947 to 1948.

Dr. Bush, for many years Americans have been in the habit of turning to you for good advice and good counsel. It has been a wise habit, and we members of this committee turn to you once again in time of crisis.

I should like the country to know that when I called Dr. Bush at his home, he agreed to come and give freely of his time, and to counsel this committee in any manner we desire.

We are grateful to you, doctor, for being here. And, counsel, will you proceed with questions?

And if it is agreeable to you, doctor, we will let the photographers proceed for the next few minutes.

Dr. BUSH. They won't bother me at all.

Senator JOHNSON. And, Counsel, you proceed with your questions.

Mr. WEISL. Dr. Bush, we are very fortunate that you have the great advantage of being not only an eminent scientist and a distinguished educator, but an experienced administrator in business, in peace and in war.

You heard the testimony of Dr. Teller, and you have heard the questions asked. We started out by discussing the sputnik.

Would you add or like to add anything to what was said in that connection?

UNITED STATES VERSUS SOVIET PERFORMANCE

Dr. BUSH. Dr. Teller's exposition on that was so complete that I don't think there is anything that I can add.

We know that the Russians have now exceeded our performance in that area, that they have put into an orbit a projectile weighing half a ton while we have thrown a few particles into outer space.

It has been a great shock to the country thus to learn that in a field where we thought we were doing well, we have been exceeded by their performance.

Mr. WEISL. Would you like to add anything else to what has been stated about the ballistic missile which projected a half-ton satellite in an orbit?

Dr. BUSH. I would restate what Dr. Teller said in some other words

PROBLEMS OF SATELLITE AND BALLISTIC MISSILE

The problems underlying the sputnik and underlying the ballistic missile are very similar. In the case of the satellite, it was necessary to get a very high velocity of the body and to guide it sufficiently well to bring it into an orbit.

In making an intercontinental missile, it is necessary to do both of those things, but to do the second one very much better and, in addition, to solve the reentry problem into the atmosphere.

I think another word can be said on this matter of the precision. In order to put such a missile into an orbit above the earth, a precision of perhaps 1 degree in guidance is sufficient.

In the days when we considered only the A-bomb as a warhead, if the missile were to be of really practical use, it would have been necessary to increase that precision by a factor of 100.

With the advent of the hydrogen bomb, however, the problem became very much easier if that was the warhead, and a precision of 10 times that necessary for the precision of a sputnik would have sufficed.

I think that had a great influence on that whole development, because that guidance problem is an exceedingly difficult one. It means to take a body traveling at very high velocities of the order of 18,000 miles an hour, and to guide it during the first few miles of its flight,

while it is being accelerated through the air, with such precision that it can be brought to earth at a chosen point thousands of miles away.

I am quite frank to say that when this work began soon after the war, I was exceedingly skeptical whether that very tough problem could be solved.

It has apparently been solved. Whether it has now been solved with sufficient precision by the Russians, I do not know; but I agree with Dr. Teller if they have not solved it, from their progress in other ways we should expect them to solve it soon.

Mr. WEISL. That faces us, as the Senators indicated by their questions, with a very serious challenge.

Dr. BUSH. It does, sir.

Mr. WEISL. Based upon your experience as an administrator in two wars, and your exposure to the problems of administration in the war effort, could you in your own words state to the committee what you would do to expedite the program of defending our country in the best possible and most effective manner?

ALL-OUT WAR, ITS EFFECTS

Dr. BUSH. Before I answer that, sir, may I say a word on just what I think the threat is, because I think there is a word to be added there before we have the picture completely before us.

Mr. WEISL. Yes, sir.

Dr. BUSH. It is a grim enough world if two countries face each other with such weapons that, if all-out war broke out, both countries would be completely demolished. That certainly is grim enough.

But we feel that under those circumstances, all-out war would probably not break out, because no man would deliberately throw us into that sort of a holocaust where he and everything else would be destroyed. It would break out perhaps by accident or possibly by desperation, but it would not be brought about deliberately.

But that is a grim situation.

But it would be a far more grim situation if we faced a situation in which the enemy could devastate us and we could not reply. We must never let that condition come about, because that would be altogether too inviting for those who reside in the Kremlin.

So this is far more than merely a problem of an advance in weapons. This country now faces definitely a situation where it must prevent at all costs being in the position where it can be overcome without the possibility of answering.

WHAT SHOULD BE DONE

Mr. WEISL. What do you suggest, Dr. Bush, that we do?

Dr. BUSH. The answer can be broken down into several parts. There is the long-range problem, and there is the short-range problem, and there is also the immediate problem.

Turning to the last one first, Dr. Teller has already said, and I would repeat, that the first priority is to be sure that we do not get in that condition, by utilizing properly the means already at our command.

We must be sure that SAC, on which our dependence rests, cannot be put out of action by a single salvo when the Russians have the intercontinental missiles to use in that manner.

That, I think, is the most important and immediate thing that needs to be done.

Second, we need to accelerate, we need to extend our guided-missiles program, to see that it goes forward at the greatest possible speed and effectiveness.

In that connection, I feel that there is nothing wrong with American scientists or with American engineers, or with American production men, for that matter.

Our difficulties are three, as I see them: First, organization; second, planning.

COMPLACENCY

And third, this very important and underlying situation which is at the basis of all of our present troubles—the fact that we have been complacent, and we have been smug.

When I say “we,” Mr. Chairman, I include myself. We all of us in this country have had a rude surprise. Now that we have had the surprise, I am far more optimistic than before the sputnik influence, because I have every confidence that the American people, now aroused, will move forward effectively. But we have had a rude awakening, and the first thing for us to do, the country as a whole, is to divest ourselves of our smugness and complacency and get to work.

Mr. WEISL. How do you suggest we get to work? How do we put first things first, in your opinion?

Dr. BUSH. Well, I have already spoken of the thing that I believe comes first.

Mr. WEISL. You mentioned SAC.

Dr. BUSH. And the second thing I would say would be this: I believe that we need to put our house in order on our missiles program as far as organization is concerned.

I would agree that it is far too late in the game to do this by cutting out this missile or that missile; the sacrifice would be too great.

AROUND-THE-CLOCK AFFAIR

But we need to be sure that the program from here on move smoothly and effectively at maximum speed. It must not lag because we have a 5-day week somewhere where it should be an around-the-clock affair.

It must not lag because of contests between services, which have been damaging in the past and which sometimes, in my opinion, have been disgraceful.

We must not let it lag because of any absence of interchange between participants, and we must be, as far as possible, sure that the men who are doing the work in the laboratories and in the industries are given a simple framework within which to work where they know who is responsible and can get their authorizations promptly and effectively without attempting to go through a complex maze of government.

I put this as the second thing to do. We need to put our organizational house in order.

UNIFICATION ACT

Now, for a third thing, and this will take more time, the reason that we are in a tangle on this program, in my opinion, is because of the absence of overall planning. Many years ago the Unification Act was passed by the Congress of the United States, the primary objective of which was to bring about unified war plans, unified programs for the development of our weapons, and for their utilization.

That Unification Act has never worked for its intended purpose.

And the next thing I would recommend to you gentlemen most seriously is that you put our unification law in order so that we can have in this country unified central military planning that transcends the interest of any particular service, that will give us the best possible utilization of our facilities and our manpower, to the end of putting us ahead again in the race.

And I say to you, if that is done, then many of the difficulties that we now face will disappear; and in particular, we will see the end of interservice contests, of which to my mind we should have seen the end long ago.

Mr. WEISL. Dr. Bush, in what respect has the Unification Act failed to work?

Dr. BUSH. The primary objective of the Unification Act was to prepare unitary plans, and for that purpose the Joint Chiefs of Staff were charged with the duty of preparing unified war plans, unified programs.

They have never done so.

PROBLEMS OF THE JOINT CHIEFS OF STAFF

I have had a great many friends on the Joint Chiefs of Staff, and I have sympathized thoroughly with their predicament. I think the difficulty has never resided in the individuals. I think the difficulty has always resided in the form of the organization that was set up. You cannot expect a man to be a forceful leader of a service, the commanding general responsible for keeping the morale of that service at a high pitch, responsible for seeing that that service is at the peak of effectiveness, and at the same time expect that man to sit down with 2 others, forget all of his service responsibilities, and plan actions from a national standpoint for all 3 services.

And the Joint Chiefs of Staff have never done that. They could not have been expected to do so, and they haven't.

INTERSERVICE RIVALRY

Mr. WEISL. You spoke of interservice rivalry. How would you eliminate that if it does exist?

Dr. BUSH. Exactly the way I have just stated. I have worked with military men for many years, and I admire the military point of view greatly. You can be sure of one thing: When a military man has a clear order delivered to him by an individual that he knows has the authority to issue that order, he will follow his orders; there is no doubt about that.

You can also be sure of this: When a program of development, of strategy, a war plan has been adopted by a properly constituted professional military body, which has the authority to carry out that

plan when it has been approved by its Commander in Chief, he will give loyalty to that program even though it contradicts some of the things that he previously believed.

The principal reason we have had service rivalries is because there has been no umpire in court.

The services themselves, the three services, have prepared war plans, all different, each one of them the best they can produce. From there on, there has been no means by which those could be brought into a unitary plan.

And since there has been no such means, the 3 plans have been advocated by the 3 services, and the discussion of them has been in the public press, and some of the decisions in regard to them have had to be made right here on Capitol Hill.

CENTRAL PLANNING BOARD

That, gentlemen, is not the way to prepare for war.

If we had an effective, central planning body acting as a staff to our Commander in Chief, digesting all of these things, putting them into their relative framework, and out of it producing a program for the country, that program, when approved by the Commander in Chief, would, in my opinion, have the loyalty of every service, and the bickering would stop.

Mr. WEISL. How would that central planning board work in the production of missiles?

Dr. BUSH. What is that?

Mr. WEISL. How would that central planning, war planning board, work in connection with the production of missiles, for instance?

Dr. BUSH. As I said a moment ago, I think that the time is past for that kind of planning on the missiles program. We are in the middle of that. It is under full tilt everywhere. We should not now stop and say "Let's do this in an ideal way."

The thing to do with our missiles program is to start from here with the conditions we now have, and to proceed to make the best of it that we can.

What I am talking about is something that may have its effect 5 years from now. Let's start now to see that we have unitary planning so that when the next thing comes up, it will be in order from the outset.

Mr. WEISL. Dr. Bush, have you suggested this plan in the past?

Dr. BUSH. Oh, yes. I have had a number of arguments with the Joint Chiefs of Staff in regard to it. I think probably if you were to call some of the old Joint Chiefs to the stand, you would hear about those in an interesting way.

ROCKEFELLER REPORT

But one time it came up very strongly. Four years ago the Rockefeller Board struggled with this matter. They did not go nearly as far as I had hoped they would, but they went a long distance in advocating changes which would improve the situation.

They, in fact, advocated taking the primary job of planning out of the hands of the Joint Chiefs themselves. That recommendation was seconded by every member of the committee, which included Mr.

Lovett, General Bradley. It was not objected to by the military advisers, Marshall, Nimitz, Spaatz. It was approved by Mr. Wilson and Mr. Kyes. The President of the United States seemed to like the report. That particular thing has never been put into effect.

Mr. WEISL. What happened to it?

Dr. BUSH. I do not know. I asked the Secretary of Defense a year ago, and I do not think he knew.

FREE SOCIETY SCIENCE VERSUS COMMUNIST

Mr. WEISL. As Dr. Teller was testifying about the great advances made in science in Russia, the thought went through my mind as to how science can flourish in a Communist society. We have always been told that science can only flourish in a free society. How do you account for that, Dr. Bush?

Dr. BUSH. I said a minute ago that, when I said we had been too smug in this country and too complacent, I included myself. I will give you the reason for that. I have learned something. When the war ended, in the few years after the war, I felt strongly that we had no fear of Russia, that we need have no fear of their progress in science or its application to military matters, for at that time the Russian laboratories and Russian science were dominated by the party members, by the commissars, really by fourth-level political hacks who sat in the laboratories and dictated their every move, who told the scientists not only what they would do but what they would believe.

And I felt that any country that puts its science under that type of control would certainly be no competitor in the type of race that lay ahead of us. But Russia changed that, and some 8 years ago she turned her scientific people free, and today a Russian laboratory is no more dominated politically than is a laboratory in this country.

And, as you will hear from Dr. Chipman, the scientists in that laboratory determine their own program. There is no interference from the political side, from the commissars, with what they do or what they think. When they thus gave freedom to their scientists, they became good competitors.

In that respect, you can say that they copied us. I merely hope that, if that is true, they will copy us in every other aspect of freedom. If they do, we need have no more fear. That will take time.

LONG-RANGE OUTLOOK

Mr. WEISL. You spoke, Dr. Bush, of the long-range plan that we should adopt to defend our security and protect our leadership in the fields of science and technology. Do you wish to comment on that?

Dr. BUSH. That is a very large subject, and one that I could comment on at great length. It goes, of course, back into all of the questions of our education. It also goes back to the thing that Dr. Teller has emphasized so well, the attitude of the country as a whole.

COMPLACENCY

We have had a strange way in this country, in our prosperity. Our standard of living has been very high; we have had a democratic country where the standard of living has been high, not for the

chosen few, but for everyone, and out of that has come a complacency, an egotism, in which we have felt that we were so good that we need not worry about anything else that happened in the world while we went our own sweet way.

We have increased that feeling in many ways. We continually tell ourselves how good we are. In every magazine that you pick up today you will find a set of advertisements, and every one of them will tell you how good this particular company is in the guided-missile field, or wherever they may be operating.

We believe it, and we have our services in their appearances before you gentlemen when they are looking for funds, also telling us how good they are. I hope they are as good as they think they are, but they tell us, in any case. So, we have gradually in this country come to the point where we have become very convinced that we are awfully good.

EDUCATION

Now, out of that has come many difficulties, and, in our educational system in particular, we have been taking the easy way. If a youngster wants to go to school and study science, well, they will let him. But if he would prefer to study something that is much easier and sweeter and less demanding, they let him do that, too, and that is because we have been complacent.

WAKE UP

And I think the primary thing that needs to happen to us here in this country is that we wake up to the fact that we are in a tough, competitive race where we have got to do a lot of good, tough work, and that that begins just as soon as the youngster goes to school. And we have got to expect him to struggle with tough subjects, so that, out of the great group of youngsters, there may be selected and trained those scientists, those engineers of the future that we must depend on for our continuing security.

That is first and foremost; that we change our whole attitude toward this subject. Then, having changed that attitude, there are many things we could turn to.

BASIC AND APPLIED RESEARCH

Mr. WEISL. Have you any suggestions to make on how we can expedite basic and applied research in this country, which is so vital to our defense?

Dr. BUSH. The two things are very much tied together, of course, and, as Dr. Teller has said most effectively, a scientist works well when he is playing to an audience.

Now, extending that a little further, our scientists in this country will perform to a far better degree, then, when they feel that the general public, the men of intelligence, are behind them, that everyone in this country appreciates the risks that we run, the necessity for having our science right on its toes, the necessity for progress in every field.

When that atmosphere obtains, the scientists will work better, and there will be more of them, because youngsters will flock into that field.

Let me say that the scientists, and I have known many of them—and let me say, incidentally, I am no nuclear scientist. I wish the press would note that, and quit calling me one. In fact, I am not a scientist at all, but an engineer working around the edges of science, but I have dealt with scientists in various ways.

HIGHER SALARIES NOT PRIMARY INTEREST

It is said they should be paid higher salaries and given greater honors. Yes; well and good. But your scientist is not dependent on that, and, in general, if he can do his work and if he has got the freedom to do it, he will be happy. If he is paid well, well and good. But that is not the primary interest that he has in mind.

Honor, yes. What he wants more than anything else is the respect of his peers, the respect of his fellow scientists. And, beyond that, he wants to feel that he is working in an area where the public about him, the businessmen, the men that he meets casually, think of him as a fellow worker for the good of the country, and not as a highbrow or egghead that is off somewhere on a pedestal and not to be approached.

CHANGE IN ATTITUDE

Mr. WEISL. Dr. Bush, how can this committee or the Congress help in some way to bring that change of attitude about or implement it in any way?

Dr. BUSH. Well, you are doing a great deal by this set of hearings, and I hope you will keep them up. The sputnik was one of the finest things that Russia ever did for us. I am very glad they fired the thing off. It has waked this country up. There has not been an awakening like this, I was going to say since the days of prohibition, but let me say [laughter] since the days of Pearl Harbor.

We have had a real awakening in this country. I just hope we do not begin to forget about it, and in a little while slack back to our easygoing ways. We have had an awakening, and we have had a scare. Let's keep the talk going. Let's be sure that we in this country do not forget that we now know we are in a tough race with a tough antagonist where there will be no mercy if we lose.

Mr. WEISL. Dr. Bush, if there is anything I have failed to ask on any subjects that you would like to present, I wish you would present it.

Dr. BUSH. I think of nothing offhand, sir.

Mr. WEISL. Thank you very much. That is all I have to ask, Mr. Chairman.

UNIFIED PLANNING BOARD

Senator JOHNSON. Dr. Bush, you placed a great emphasis in your testimony on the need for truly unified war planning in our Defense Establishment.

Dr. BUSH. Yes, sir.

Senator JOHNSON. Now, your proposal seems to require legislative action. I should like to ask you whether you believe there are any effective ways of dealing with the war-planning problem without action by Congress.

Dr. BUSH. I think it could be done without action by Congress, but I think it can be done a lot better if you gentlemen will take a hard

look at the Unification Act and will modify it with the experience of the past 10 years in mind, and with the object of putting in there as the central feature, exact provision for unitary planning so that we will be sure to get it.

HOW BOARD SHOULD WORK

Senator JOHNSON. Doctor, will you spell out in some detail how your planning board would work?

Dr. BUSH. I have already said that it is not fair——

Senator JOHNSON. Not what?

Dr. BUSH. Not fair, not reasonable, to ask the Joint Chiefs of Staff to do this central planning, to be at the same time commanding generals, commanding admirals, and sit down as a staff to the Commander in Chief to work out the unitary plan. It is just against human nature.

CHANGE JOINT CHIEFS OF STAFF

I would put the preparation of that plan into the hands of three men as eminent, of as high rank, as distinguished as the Joint Chiefs, detached from all further service to their individual services, on their last assignment before retirement, if necessary.

I would bring back retired officers for the purpose, if I found just the right men there.

I would pick those officers as men who have demonstrated beyond peradventure that they can rise above service interest when so ordered by the Commander in Chief, and do their planning on the basis merely of what is the best effective plan for the country.

I would support that group of men by giving them the opportunity to pick throughout the services the brightest captains and colonels that they can find for service with them. I would support them also by giving them the authority to bring in with them civilian scientists, civilian professional men, other types, in any way that they could use their work most effectively, and I would provide that when they made a recommendation, it would go to the Secretary of Defense and the President.

I would let it go through the Joint Chiefs of Staff in order that they might make comment on it, but I would not give the Joint Chiefs of Staff any authority to hold it up or to alter it.

Senator JOHNSON. Do you believe a program of that kind would prevent repetitions of our present missile situation?

Dr. BUSH. I think it would, sir.

Now let me say that while you asked for specific form, and I gave you one, I hold no brief for that particular one. If someone can produce a better one, I will be all for it.

The essential thing is that in one way or another we get the thing we are looking for, namely, a unified war plan.

ROLES AND MISSIONS

Senator JOHNSON. Doctor, in your opinion, in the light of the modern developments in weapons systems, will it be possible to achieve maximum military effectiveness while maintaining the existing divisions of roles and missions between the three services?

Dr. BUSH. Well, let me answer that in two parts.

I would not favor merging the three services into a single service in the same uniform, by any manner of means. One of the greatest assets we have in this country is the tradition, the esprit de corps, the pride of the three services, and that we must preserve. That is not an asset to be thrown apart lightly.

SINGLE CLEAR AUTHORITY

But I do know this: That when we have had the 3 services under a single commander in the field, in Germany, in the last war, in the Far East, in Korea, when we had the lines of authority clear, and the 3 services present, we have had proper collaboration and joint action between them. We have had proper handling of their three facilities.

I would like to see that produced on a national scale for planning as well as for field operations.

For that purpose, I think that it is not necessary to merge the three services into a single uniform, and I think it would be a mistake to do so.

Senator JOHNSON. You heard Dr. Teller's testimony, and you heard his five-point program.

Dr. BUSH. Yes.

Senator JOHNSON. Do you generally agree with that list of priorities?

Dr. BUSH. Yes.

CIVILIAN DEFENSE

There is one thing I would say in that connection. On this civilian defense affair, and on the shelter matter, I am still in the position of the gentlemen from Missouri. I want to be shown.

It is exceedingly important. It should be examined with great care. But I have this feeling in my mind. Let me go back just a moment, if I may. If there had never been an A-bomb, if there had never been the harnessing of nuclear energy for war purposes, we would today find ourselves in the kind of a world in which we now stand. The difference would be that we would be terrified by chemical and biological warfare instead of atomic warfare.

The war of the future may not be exactly what we think it would be. Suppose we made provision against fallout, suppose we made provision by shelters against H-bombs. I am not sure that those could not be overcome, if there were a chemical or a biological war-head, and I would like to see that examined with great care before we launch on a program.

If it can stand that analysis, by all means let us do it, provided we do not fall into a Maginot-line complex, and emphasize the defense at the same time that we neglect the offense, because our safety lies primarily in having such a strong offense that no one will ever dare to challenge us.

Senator JOHNSON. As I recall it, that was exactly what Dr. Teller recommended that we take a look at.

Dr. BUSH. Yes.

Senator JOHNSON. I quote, "take a look at our passive defense system," and that you would then say that in general you are in agreement with the five-point priority system that he recommended.

Dr. BUSH. I think I would put them in a little different order but they are certainly all very important.

CATCHING THE SOVIETS MEANS SACRIFICES

Senator JOHNSON. Now, finally, I realize we have men who are somewhat bolder than others, and some who want to go a little further, a little faster than others, but I have a letter here sent to me through Senator Green from Professor Probst, who has been a consultant on 2 United States ballistic missiles for several years, and I have just read 1 or 2 paragraphs of it.

The letter was delivered to me since we started the hearing this afternoon. I want to read you a paragraph or two from that letter and have your comment.

If we are to catch up with the U. S. S. R., and I believe this may take as long as 10 years, then we must face up to the fact that our present defense budget will probably have to be doubled. In terms of annual gross national product, this is not large, but would nevertheless mean a reduction to some extent in the present standard of living for all America.

In spite of the complacency of America, it is therefore necessary for every individual to realize that we are at war, and such a state requires corresponding sacrifices. The cries for leadership and individual sacrifice for this may be the last chance of the West. The question then is whether we shall meet the challenge of who shall be in the vanguard of the sputnik era.

There is an article entitled "Space Flight and Security." It is an article that is to be published in the Canadian Forum. It was written by Dr. Probst, who is an associate professor of engineering at Rhode Island University. I should like to have your comments.

MONEY NOT THE ONLY FACTOR

Dr. BUSH. In the first place, you do not get results by simply pouring in money. If you put 10 times as much money into basic research today, you would not have 10 times as many scientists.

On the other hand, there are some things that today call for more funds without doubt. We need to give greater support to basic science in this country than we ever had, and it is about time we began to do it on a proper scale, but that does not call for great funds.

We can use more funds, I am sure, in our guided-missiles program, in our intercontinental-missiles program, and wherever additional funds can be used effectively, by all means let us make them available.

So, I see our expenditures going up for a bit, certainly. But I would also say to you this: That if we had really integrated central planning in this country for years ahead, to get the emphasis on the most important things and to be sure that that emphasis is sufficiently intense, we will at the same time find, I am sure, many ways in which money can be saved, so that in the long run over a period of many years I am not sure that our military expenditure needs to go up enormously. I am sure it has to go up for the moment, and for perhaps 5 years. Then I would like to see a thorough study made first to see what can be done in the other direction.

Senator JOHNSON. So in conclusion, Dr. Bush, you not only would join Dr. Teller in his five-point recommendation, but you would probably put at the head of the list, a redrafting of the Unification Act that would bring about truly unified war planning, and that is the substance of your testimony?

.. Dr. BUSH. At the head of the list, I would put vigorous action in every way to be sure that we do not let ourselves get in the position where we can be attacked suddenly and put out of business by a single salvo, and that certainly means at the present time attention to SAC, to be sure that its dispersal is correct, that its readiness is correct, so that it cannot be thus destroyed.

We must also plan in this manner continuously, and that planning should now go on.

For example, we talk about intermediate-range missiles. We must not get into the situation, gentlemen, where we have missiles and the enemy have missiles, and he knows where ours are and we do not know where his are.

That must also have immediate attention to guide our program appropriately. These things come at once.

I say also that there is a second thing. I would put our organizational house in order in regard to the handling of the missile program, and so forth.

And third on the list, I would recommend to you gentlemen that you take a look at the Unification Act and bring that up to date, and incidentally, while you are doing that I hope you will also take a look at the Atomic Energy Act and be sure that our interchange with our allies is not unduly hampered.

Senator JOHNSON. Senator Saltonstall?

Senator SALTONSTALL. Thank you, Mr. Chairman.

Dr. Bush, I think Senator Johnson asked the questions I had in mind on the Unification Act.

FEAR OF GERMAN TYPE STAFF

You and I have discussed that several times, but I do have one further question.

Do you favor one Chief of Staff?

Dr. BUSH. Well, may I make rather an extended answer to that, because that brings in a very interesting question.

At the time that the Unification Act was passed the Congress of the United States was quite properly afraid of the idea of something paralleling the German Central Staff, and they were also very much afraid of a general staff that would take command, and the talk about a single chief of staff, revolved about those ideas.

Now if a chief of staff could take command then a single chief of staff would be a mistake for this country, I am sure, for our Commander in Chief in this country is a civilian, the President of the United States, and we don't want to change that.

If on the other hand the Joint Chiefs of Staff are a planning agency, an advisory agency and not a commanding agency, then I don't care whether you have a single chief of staff that is the chairman, or whether you rotate it, or what you do, so long as that body sticks to its business and does the planning that we need.

There has been a good deal of criticism of the German General Staff.

True, it lost the first battle of the Marne by interfering with the armies in the field, but that was because it took command of the field armies.

It ceased to be a staff, and it became a commanding committee, than which there is nothing worse in military control.

Now our Joint Chiefs of Staff once took control and began to be in a position of giving orders, and controlling the forces in the field. The Rockefeller Board tackled that and it ceased at that time.

We have not since had our Joint Chiefs of Staff in a position where they were a commanding committee.

The Joint Chiefs of Staff, or some body made up similarly to theirs, should be a planning agency only and not a commanding agency, and this question of a single Chief of Staff revolves about the question of command, and on that I would say quite forcibly let the command proceed as it does now, through the military channels to the President of the United States as Commander in Chief, and through the civilian structure that surrounds him.

Senator SALTONSTALL. So the essential thing is the planning done under a civilian Commander in Chief and his assistant, the Secretary of Defense.

Dr. BUSH. That is right, sir, and if we have an Army in the field, let the commander of that Army be appointed by the President of the United States on the recommendation of his military staff, and when that man is appointed and in the field let him not be interfered with by Washington in the proper discharge of his duties.

Senator SALTONSTALL. As I understood your testimony, you said on the missile program that competition between the services had been going on, but that the development had gone so far that you would not necessarily eliminate any weapons that were now being worked on.

Your testimony on that was similar to Dr. Teller's?

Dr. BUSH. Yes; I am not a missiles expert of course, but the point I wanted to make, Senator, was this: That I feel it is too late in the day to cut out some of these things.

If you cut out competitive things early it costs you very little. But if you let a thing go to the extent that some of these things have gone and then cut them out you make a great sacrifice.

I would leave this to the judgment of the people handling the program and merely wish to say from my standpoint I would like to emphasize that it is pretty late in the day to do severe cutting.

Senator SALTONSTALL. If my memory is right, you were at one time the chairman or a member of the Research Commission which was originally established under the Unification Act, were you not?

Dr. BUSH. Yes, I was Chairman of the Research and Development Board.

Senator SALTONSTALL. And then that was changed to an Assistant Secretary?

Dr. BUSH. That is right.

Senator SALTONSTALL. And the Commission was cut out?

Dr. BUSH. About 4 years ago.

Senator SALTONSTALL. The Research Secretary up to the present time certainly has not had sufficient authority, in my opinion. Do you believe that Mr. Holaday, who is in the position today of director of missile effort in the Secretary of Defense's office, has enough power?

Dr. BUSH. Well, I really don't know, of course, but I do know this: that I feel perfectly certain that the Secretary of Defense has the power and can put this matter into order.

If there are any obstacles in his way I hope you gentlemen will remove them but I don't believe there are.

How he does it, I would leave to his judgment, and I have great confidence in him.

What he has done, I understand is to name Mr. Holaday, reporting directly to him, to handle the affair. He has all the authority, McElroy has. What he proposes to delegate, I don't know. But I judge quite thoroughly for that purpose.

Just one more point on that, Senator, you speak of this being a research and development program. It is also a production program today and will be, and those two things are quite different.

I know we have sinned in the past and I think we are still sinning in this regard. We have at times had our research and development under our production people, under our procurement people.

Now, industry learned long ago if you put the research department under the production department you get nothing, because the job of the research department is to make life tough for the producers, and when you put the research under the producing group, you get nowhere.

We have still that situation in our own missile program in spots, and one thing that I think needs to be straightened out is to be sure that the research reports as research right clear to the top, and production reports separately, so that we don't get one subordinate to the other.

But how that is to be done, I don't know. I feel it is in competent hands.

Senator SALTONSTALL. In other words, what you believe is that the top research man, whether it be an Assistant Secretary of Defense or whoever, should be free from the problems of production.

Dr. BUSH. Free from the control of production.

Senator SALTONSTALL. Yes.

Dr. BUSH. Because if you take a research man and put him under a production man, you won't get any research that amounts to anything.

If you put him under the sales department you will just get monstrosities.

Senator SALTONSTALL. Let me ask you one more question:

You talked a number of times about, if I remember correctly, the possibility of the Federal Government stimulating science through some form of scholarships.

Am I correct in that?

Dr. BUSH. Yes, and I was very glad, when the National Science Foundation was established, that you gentlemen included a provision for scholarships, fellowships, which has gone very well.

Senator SALTONSTALL. In your opinion that program is working out well?

Dr. BUSH. I think it is, although I don't think we have gone nearly far enough in that regard yet.

ON LOOKOUT FOR BUDDING SCIENTISTS

In Russia I understand that a very careful search is made throughout the entire country to find early those youngsters who have scientific talent or the promise of it, and then with that promise they are subsidized all the way through their studies, if they can go that far with benefit to the state.

We still have a situation in this country where young men of great talent are stopped from getting all of the education they need for financial reasons.

We ought to get beyond that. We have made great progress with fellowship programs, the universities with their scholarships, and so forth, but we should not stop any youngster in this country of real scientific ability from getting all of the education he can get, at public expense if necessary, for our benefit as a country as a whole, not for his benefit but for ours, and let me add just one more thing:

In Russia he is given examinations from time to time and when he flunks them he goes into the Army. In this country, we put him in the Army anyway. Now that may be all right; provided the services continue his education effectively.

But we cannot afford to interrupt the man's progress toward a career as an engineer or a scientist by that manner or any other manner in this crisis.

Senator SALTONSTALL. Then what you say is we don't need a change in the law with respect to the scholarships for science?

All we need to consider is how much money we want to put into the National Science Foundation for that purpose.

Dr. BUSH. No; I think you want to examine, Senator, ways of subsidizing youngsters.

Senator SALTONSTALL. Thank you very much.

Dr. BUSH. And by all means when you do it, if you will subsidize it in such a way that it does not place an additional burden on the university I think that would be a good idea too.

Senator JOHNSON. Before I go to the next questioner, I want to ask Dr. Bush if he would tell the committee how he feels the missile program would have developed if his planning had been in effect.

Dr. BUSH. Well, I think for one thing we would have had fewer missiles and more concentration on the ones that we have. I think we might have had competition earlier between groups of scientists in the days when experimentation was relatively inexpensive.

But I feel when we came to hardware, which is exceedingly expensive, that by that time missiles for a particular purpose would have been merged so that we would have had 1 program and not 2 or 3.

I believe that in many other ways we would have had a program that would have made a great deal more sense and a great deal more speed.

Senator JOHNSON. Doctor, don't we have a planning agency in the National Security Council?

Dr. BUSH. Well, the National Security Council, Mr. Chairman, as I understand it, and you gentlemen know more about this than I do, is the place where Treasury and State and Defense meet, and is an advisory body to the President, where national policies are being formulated on many things.

And I assume that it is their function to bring together these elements, and I don't understand that it is their function to do military planning.

MILITARY PLANNING BY THE MILITARY

In fact I would not want to have my military planning done by a group of financial men, or by members of the State Department; I'd feel about as secure if I went into a hospital for an operation and had the diagnosis made by a group of lawyers.

I think we want to keep our military planning in military hands. I don't think we want to do our military planning by using civilian

bodies except for advice. I think we want to have our military so they will use every bit of civilian assistance that they can possibly use effectively, so that they will not be afraid or reluctant to bring in outstanding specialists in any field, and to listen to them and to work with them.

But I think the primary responsibility for military planning should rest on the man in uniform who devotes his life to that very thing.

Senator JOHNSON. So you don't have a very high regard for the National Security Council as a planning agency?

Dr. BUSH. I have a very high regard for them.

Senator JOHNSON. As a planning agency, I said.

Dr. BUSH. Oh, yes; as a planning agency I have great regard for them.

But as a planning agency in the field of general military policy where our military posture and our military possibilities are joined with the questions that come up from the State Department in regard to foreign relations, to bring about a joint affair that can be properly called overall national policy.

Senator JOHNSON. Don't the recommendations of the Joint Chiefs go to the National Security Council?

Dr. BUSH. They are supposed to. In fact, I think the theory is that the Joint Chiefs of Staff will keep the Security Council informed as to the military aspects of any problem that they may meet.

Senator JOHNSON. Senator Kefauver?

Senator KEFAUVER. Dr. Bush, you have had a great deal of organizational experience in Government and in our Defense Establishment so I wanted to ask you this question.

We all realize that the immediate matter is a military one, to get our missile and satellite programs going, but in the long pull that involves many important civilian aspects, education, scholarships, basic research. I feel all of those things should be coordinated under one civilian control.

That is the trouble with the present setup, it is that while Mr. McElroy is head of the Defense Establishment, maybe a very competent man and he will do what is necessary for defense, that he would not have the knowledge of or be interested in National Science Foundation or scholarships or application of these things to civilian purposes.

Don't you feel that we should have—and I join some of my colleagues in advocating a Secretary of Science which when established would have all these things under him?

Don't you feel that while it might not be possible to unscramble some eggs that are already scrambled, on the basis of getting this overall program done that we ought to look forward to and work toward getting our satellite, our missile, our research, our scientific education and so forth under a civilian cabinet, a Secretary who would have authority to speak with equal authority to the Secretary of Defense.

Dr. BUSH. I have struggled with that problem, Senator, for quite a while, and I am still confused.

Senator KEFAUVER. Would you mind stating your best thinking about it?

Dr. BUSH. My best thinking today is this: science is found in every department. It is an ingredient of everything we do today. If we made a Department of Science and removed all the science bureaus

from the various other departments and put them in that place, I am sure it would not work.

The Bureau of Mines cannot work outside of the Department of Commerce.

You cannot have agricultural research over here, and the Department of Agriculture over there.

I am sure that it would not work to try to gather all of the governmental science that there is into one place, and I am afraid that if you created a Department of Science and put in it only one or two incidentals, that the fellow who headed the Department would feel pretty lost with the great bulk of science going on elsewhere, in the Department of Defense and in the other departments.

Rather I would say this: Science permeates all of our affairs. It is not a thing that can be isolated and placed over by itself.

I hope that we will have many members of the Cabinet who have perhaps not been themselves scientists, or engineers or the like, but who understand scientists and are sympathetic toward them. I think everything we do must be done in the light of the advance of science but I am not too sure that it would help that along to suddenly create a Department of Science.

SEES NO NEED FOR CHANGE IN LAW

Senator KEFAUVER. Dr. Bush, our present setup, I believe, is that the Secretary of Defense, Mr. McElroy, is the so-called missiles czar. He has taken over the direction of all of the activities of the services. The President has a very able man in Dr. Killian as a personal special adviser.

Is that the kind of setup where you can get coordination and the best results in your opinion?

Dr. BUSH. Certainly, the Secretary of Defense has all of the authority that is necessary to bring about coordination that we are looking for, if he exercises it.

I hope and trust that when he does exercise it, if there is some service that is not satisfied that the decision on the matter will be made behind closed doors and after proper evidence and proper consideration and not by argument in the public press.

But if the Secretary of Defense is a determined man, and intends to bring his house into order, and if he is thoroughly supported in doing so on Capitol Hill, and elsewhere, the job can be done without any further law, I feel sure.

Senator KEFAUVER. What did you say, Dr. Bush, would be the ideal executive setup for the best possible efficiency in this program and the best possible coordination of the various efforts?

Dr. BUSH. I don't know, sir. I can't answer that question. It is an exceedingly complicated affair, and we are now in the position where we must go on, we cannot stop and create an ideal form, an ideal situation.

We have to do with what we have and get on with the job, and I am not enough acquainted with the details to know where I would move if I suddenly had that responsibility.

I am very glad that I do not.

Senator KEFAUVER. Mr. Chairman, I wonder if I could ask if Dr. Bush would think the matter over and if he has any thoughts

about the organizational setup to communicate with the chairman of the committee?

Dr. BUSH. If I see a solution, Senator, you will have it at once.

Senator KEFAUVER. I hope you find one, Dr. Bush.

Thank you very much

Senator Stennis (presiding). Senator Flanders.

Senator FLANDERS. Dr. Bush, I was interested in the suggestion you made as to the nature of the military planning board.

It would be a simple job perhaps if we had one, but it is complicated by the fact we don't have any training for the whole military problem and we have no service for the whole military problem.

We only have these 3 fragmented trainings and 3 fragmented services.

Perhaps in an ideal country, state, some time, we may have a unified training and a unified service.

Until we do, I take it that your proposal is to take men of character and of age who have no longer any intense personal ambitions with regard to the service in which they were brought up.

It seems to me that is about the only solution we can think of.

Can you think of any other?

Dr. BUSH. I think you are right, sir, and I am perfectly certain that such men can be found.

During the war I had the privilege of acting as chairman of one such committee. It was the committee to which General Groves reported, and it controlled the entire atomic-energy program. That committee was made up of 1 admiral, 1 general, Dr. Conant, and myself. That committee never departed in the slightest iota in its consideration of what would make that program go best by any service consideration, and if a proposal was made that a particular service do some particular thing, the man who came from that service was just as likely as anyone else to say, "I think that can be done better elsewhere."

I know that given the right atmosphere and the right circumstances military men can depart from their service background and take the broad view, and I have known many individuals that could do it.

I am sure the men can be found, and that they can do that sort of thing properly.

Let me say also that this matter of having the right experience can be misunderstood today.

EXPERIENCE OF PAST WILL NOT HELP

If there is another all-out war it will be so different in its nature from anything that has ever gone before that no military experience in the field in the past will ever be sufficient to qualify a man to judge what is going to happen.

That has got to be grasped by a more general understanding and a more general type of intellect and background.

Past field experience of any kind is not going to be a very serviceable thing; if we deal with a war in the future fought by long-range missiles and the like.

Senator FLANDERS. Thank you.

That has troubled me. The constitution of the Board and finding a situation in which men would not consider themselves in connection

with the service in which they were educated and trained has seemed to me to be the problem to be overcome.

Now I want to present another problem.

If I understood you, Dr. Bush, you thought that you could get along somehow or other as best we could with the present situation so far as missiles are concerned.

Now the enterprise of the public press has gotten together this picture which shows all the missiles there are, and it looks to me as if there were too damned many of them.

Dr. BUSH. Of course I realize that.

Senator STENNIS. Let's have quiet please.

Senator FLANDERS. I realize that this picture is in some ways an exaggerated one; some of these missiles are for such different purposes that they are not comparable, but there is, nevertheless, a tremendous complexity in the thing, and I wonder if you really don't think that we ought to—wait a minute, I am getting into a double negative—I wonder whether you would agree that some simplification of this thing ought to be undertaken?

Dr. BUSH. I am sure, Senator, that when the missile problem is now approached in a new light there will be found ways of simplifying it.

Senator STENNIS. Just a minute, please.

Under the rule of the Chair, I understood you gentlemen were to desist after the witness was on the stand.

Senator FLANDERS. I am afraid I tempted them too much.

Senator STENNIS. I was talking to the photographers.

So let's desist on that; proceed, Senator Flanders.

WARNS AGAINST PRECIPITATE SOLUTION

Dr. BUSH. I am certain, Senator, that when the missile problem is approached in the full light of the present day there will be found ways of simplifying it. I would not be at all surprised if ways were found of ceasing work on some missiles to put emphasis on others. The simple caution I wanted to put in is that we should not be precipitate in doing this because the sacrifice of abandoning a program in its last stages is very great, and the saving can sometimes be very small. The time to abandon programs is before they become very expensive.

Senator FLANDERS. Just one other question.

As you know, Dr. Bush, I have been concerned with problems of invention and design and production, and I learned in my experience that it is not wise to let invention and design interfere with production too often. In other words, they—in other words the new ideas should come in bunches if you have got a workable thing. Make it for a while; meanwhile prepare for the next version. In your experience, has there been any tendency to interfere with production, of mass-production objects of defense by improving them continuously instead of in batches?

Dr. BUSH. There always has been and there probably always will be, and there is nothing that a production man resents more.

Certainly your changes should come along in batches. But let me also say this: That there is a vast difference in that regard between an industrial organization where profit must be shown, and due econ-

omy shown, and the situation in time of war, where one can tolerate all sorts of costs provided there is a real object in making a change.

I think we have erred many times in allowing little changes to interrupt production, we have also erred at times by holding production so rigid that changes could not be made. To make a proper balance between those two things requires judgment of the finest sort. That is where an executive in an industrial establishment finds considerable advantage.

Senator FLANDERS. I don't know who it was who said it, but the essential of war was "to get there fustest with the mostest." I am placing most emphasis on the "fustest."

That is all, Mr. Chairman.

HOW STAFF WOULD BE ORGANIZED

Senator STENNIS. Gentlemen, my name is next on the list. I will be very brief.

I want to thank you, Doctor, for your comments on all the problems and especially the one you commented on with reference to the problem of the Chief of Staff, their problem with the problems of planning.

As one who had been on the Armed Services Committee several years, and as one who thinks very highly of every member of the Chiefs of Staff, very highly, men like Admiral Radford, General Ridgway, General Vandenberg, who are no longer among us, among others, I nevertheless felt it is more of a tussle and wrestle between the men and that we do not get the composite advice from them.

I feel like your suggestions are very timely, that something must be done, and that the complex of the fear of the German General Staff or chief of staff, is the real problem. I believe you mentioned that a while ago. I was called away momentarily. But I think your advice is very timely, and that something must be done.

We create additional officers all right. We have a great number of secretaries and assistant secretaries, but we do not get at the real heart of this problem by merely creating officers.

As I understood, you would not confine this planning group, though, to those that were finishing their career. I thought you said you would probably call in some of the junior officers; was that not correct?

Dr. BUSH. Certainly.

Senator STENNIS. Yes.

Dr. BUSH. Certainly, because you will find some of the finest minds you will find anywhere among the younger officers, not necessarily the captains and the colonels, the next rank up, but you want the juniors in, to do the hard thinking and analysis. You want to support this by civilian analysis. You want to give them every facility that they can use.

Let me say again in response to what you said; some of the men that you mentioned are men that I was very fond of. My personal relations with men on the Joint Chiefs have always been very fine, and I have admired them, and some of them have been close friends.

I recognize the predicament in which they are placed. It is an impossible situation to put any man in, and I sympathize with them. They cannot, as a practical matter, do anything but what they have

done. They endorse the plans of any one of their members. They do not interfere with the planning of a single service, and they compromise around the table. It is not good enough, gentlemen.

Now, you can find men who can do better. Some of them are already retired. If they are, bring them back. There is no harm in that; and men can be found and can be put to work, and out of that can come some very good planning indeed, I am sure.

Senator STENNIS. At the present time, they are victims of their own system when they come in there.

Dr. BUSH. Well, I think they are more the victims of your system, because you are the people who passed the Unification Act.

Senator STENNIS. That is well said, but most suggestions I have heard for changing it have been rather stoutly resisted by the services, not that they are too happy with what they have, maybe, but because they think they might fare worse.

Dr. BUSH. You can be very sure if you start a change along the lines I have outlined, or some other lines, that will produce the same effect, it will be very vigorously resisted.

Senator STENNIS. I think we, the Congress, could pretty readily make some good changes if we just had—if the military made up its mind that it wanted the change and would give us the recommendations along the lines that you speak of.

May I mention one other thing here that you have touched on rather fully, but in connection with someone having the authority of unified authority with reference to the various aspects of the missile program, and you said it came up to the Secretary of Defense, and you assumed that Mr. Holaday had the authority that the Secretary had. But, Dr. Bush, does not someone have to make decisions to make this program move that goes even beyond the Secretary of Defense, and has authority over the Budget Bureau or any other department that might not agree with those plans?

In other words, does it not have to be right up next to the President or exercising the President's authority, rather than the Secretary of Defense' authority?

Dr. BUSH. I do not think you people are going to give anyone authority to spend money around here unless you appropriate it.

Senator STENNIS. Well, we appropriate the money sometimes and then it is not spent.

Dr. BUSH. Yes.

Senator STENNIS. Because, we will say, the Budget Bureau or the budget officer or the Department of Defense, they stop them.

But my point is that this authority to have a unified control power to make decisions, and then the authority to make it move, has got to be even above the Secretary of Defense or the Director of the Budget or anyone else. And has it not got to be the President's authority that he is exercising, the President himself?

Dr. BUSH. Certainly, we think that the Secretary of Defense, acting within the authority that he already has, can straighten matters out within the Department of Defense.

Certainly this is broad enough. Certainly it includes also recommending what additional funds he may need. Certainly there are also matters that must be decided by the President of the United States, and certainly if he makes recommendations for more money, they ought to be very sympathetically considered by you gentlemen here.

But I hope and trust that the President of the United States, confronted with this national emergency, is going to give us all of the action that we would ask for, where action by the President alone will resolve the difficulty. And that by giving us that leadership, he will help to keep this country alerted to the danger in which we are placed.

Senator STENNIS. I am sure that is his great purpose, too. But my point is that even if the Secretary of Defense has settled all matters as between the Departments of Defense he does not have the authority and the power to proceed on a certain missile, into development or into production if the Budget Bureau does not agree.

There has got to be an authority, it seems to me, that it is the President's authority itself, someone exercising his powers rather than the powers of the Secretary of Defense. Is that not correct?

Dr. BUSH. Why, certainly.

Senator STENNIS. Yes.

Dr. BUSH. I hope if there is a jam between the Secretary of Defense and the Bureau of the Budget, that the President will resolve it.

Senator STENNIS. And this authority, it seems to me, ought to be really right next to the President, directly exercising his powers, always under his command, of course. You think that is correct?

Dr. BUSH. Why, no, I think I know what you are getting at. I think that the job of carrying this thing out is primarily the job of the Secretary of Defense, and that he can delegate it in such way as he may see fit as he proceeds.

When there are larger questions, things that need to be worked out between the Department of Defense and other Departments; then the thing that the President of the United States should do is to make such decisions with proper advice.

But I do not think we ought to put the management of this program in the President's Office. I think it belongs in the Department of Defense.

Senator STENNIS. I did not mean that. I do not see how he can give so much personal attention to so many decisions because of his other duties and worldwide demand.

What I was thinking about was someone authorized to act for him, even if it was over and beyond in some cases, the Secretary of Defense or the Director of the Budget, and until someone is so authorized they cannot act for the President. But it has to have his personal attention in all these matters. I am sure we are striking at the same thing here.

Dr. BUSH. Yes; in a little different way.

Senator STENNIS. Yes.

Dr. BUSH. Because my concept is that the President, with his enormous responsibilities in many fields, that he cannot possibly cover in detail personally, must bring action about through men he trusts, through men who understand those fields and men upon whose advice he is ready to act. That is the way he has to operate.

Senator STENNIS. Well, I thank you, Dr. Bush.

Senator Smith?

Senator SMITH. Yes; Mr. Chairman.

Dr. Bush, what is your feeling about cancellation and termination of the Air ROTC in technical and scientific schools at California Technological Institute?

Dr. BUSH. I really do not know, Senator Smith; I really do not know enough about it to be entitled to an opinion. I have not studied it recently.

ROLE OF AIR FORCE ACADEMY

Senator SMITH. Dr. Bush, do you feel it is realistic for the Air Force Academy to continue stressing training of pilots or do you think that the Air Force Academy should start training its cadets to be technicians and scientists?

Dr. BUSH. Let me answer that a little more generally in regard to all three services. There was a time, and it is not so long ago, that if a man in the services, in uniform, paid a great deal of attention to the technical aspects of his profession, to the scientific aspects of his military arm, by so doing he sacrificed all possibility of ultimate high command. He became a special category where he could go a certain way but no further.

That was due to some strange feeling that a man, to exercise command, must not become a specialist; or, to say it the other way, that a man by becoming a scientific specialist or an engineer disqualified himself in some strange way from becoming a commander.

I think that was a complete fallacy, and I think it did us a great deal of harm, because it threw an obstacle in the way of many of our military officers becoming highly qualified technical men.

Now, many of them are. Many of them are excellent engineers. Many of them are good scientists in their own right, entering science as I did from engineering.

I take my hat off to the ones who have done this. But the cards have been stacked against them for a long time, and I think the obstacles have not today entirely been removed.

Certainly, on the second part of your question, today we are talking about emphasis on science in our high schools, of continuing its emphasis in our universities of having a better atmosphere for the carrying on of science in this country. It certainly is true, when we say all of these things, that with still more emphasis, the service academies have got to do a better job in teaching science to men that they take into the military services, and a far better job than they have done in the past, so that we may have more officers with a thorough understanding of the things they need to understand.

Senator SMITH. That is all, Mr. Chairman.

Senator STENNIS. Senator Symington.

COMPLICATED COMMITTEE STRUCTURE

Senator SYMINGTON. Dr. Bush, this is where you and I came in. [Laughter.]

I was interested in your testimony about missile reorganization, and noticed a chart put out by the Assistant Secretary of the Air Force in charge of Research and Development recently in Life magazine. Have you seen that chart?

Dr. BUSH. Yes, sir.

Senator SYMINGTON. On this chart there are 95 boxes of authority.

Dr. BUSH. Yes, sir.

Senator SYMINGTON. Since that time, so I understand, they have added a couple more boxes.

Dr. BUSH. No doubt.

Senator SYMINGTON. Is that what you were talking about when you said that you thought there could be a general reorganization of this setup?

Dr. BUSH. Yes. That is one of the things I had in mind, Senator. I think that it certainly is possible to simplify that structure, so that the man who is working intensely in this field, who is in charge of one laboratory let us say, will know where he can go and get clear-cut decisions, and get them at once, and not get lost in the maze of Washington, which, I think, is what now happens to a great many people.

Now, beyond that, I would say this: that how to do it, just where one should streamline it, and so forth, I do not know. I would have to study it plenty before I would think I was entitled to an opinion as to exactly what I would want to see done. But I think we have got competent men in office to do it.

Senator SYMINGTON. Without passing you any bouquets unnecessarily, it is a fact you have probably had more administrative experience in the combined fields of engineering, science, and government than anybody I know.

Could you run anything on this basis?

Dr. BUSH. When I ran the Research and Development Board, Senator, it got to be pretty bad, but I do not think it got to be that bad. But there is a tendency of any governmental organization to grow, to branch out, and to take on additional buds and pockets and so forth, and this has happened to me in the past.

But I think, having looked at that chart, if that chart is accurate, that this has really gone to the point where a thorough job of reorganization and simplification is in order.

Senator SYMINGTON. Have you ever figured out in your own mind, based on your long experience inside and outside the Pentagon, what a true businesslike job of streamlining responsibility and authority over there would save, in your opinion, the American taxpayer?

Dr. BUSH. Well, you know, you are asking an impossibility. A governmental operation can never be like an industrial one. The conditions are entirely different.

For one thing, no man who runs a bureau in Washington has a single boss to report to, or a board of directors. He has about 18 places that he reports to. He reports to the committees of Congress, perhaps to the head of his department, or to the President, to the Bureau of the Budget, to the Civil Service Commission, to the Comptroller, to say nothing of the General Services Administration.

He has utter confusion when he tries to find out where he gets his instructions and his authority.

In industry, he has got a single board of directors, and if he can satisfy them, he can go ahead.

So, we never can have in government a nice simple affair as we can have in industry, and I do not think we should be too critical of the men who put together Government organizations. They do become unduly complex under these strange conditions, and I just hope they will not get too bad.

Senator SYMINGTON. We have talked a lot about missiles, and an organization with respect to missiles.

But what you are talking about, from the standpoint of how to do the job, does not just stop at the missile field. It embraces the entire concept of the Department of Defense, does it not?

Dr. BUSH. Quite right, sir.

Senator SYMINGTON. Thank you.

Dr. BUSH. And missiles are a new affair. They look to be exceedingly important.

But I think one thing that needs to be done as we proceed and as we get long-range missiles, is to make an examination of the relative effectiveness for various purposes of manned bombers and missiles.

It is not entirely a one-sided argument by any manner of means, and I hope and trust we will not precipitately consider as Brother Khrushchev apparently does, that the aircraft is obsolete. It is not, by any means.

Senator SYMINGTON. Thank you, Doctor.

Senator JOHNSON. Mr. Case.

Senator CASE. Thank you, Mr. Chairman.

Dr. Bush, I agree pretty much with what Senator Symington has said with respect to your long experience. I always feel when you testify on things like this, it is the voice of experience, and you certainly have had more experience in coordinating or directing scientific work in Government than anyone that I know.

And based on that, and based upon the fact that you were the Director of the Office of Scientific Research and Development during the war, would you say that your responsibilities and your powers in that position were those of a czar or a coordinator?

Dr. BUSH. I was a czar in my own area.

Senator CASE. Was that primarily in the field of research or production?

Dr. BUSH. Research, development. In missiles, weapons, generally, and in the field of military medicine.

WOULD KEEP DEVELOPMENT IN DEPARTMENT OF DEFENSE

Senator CASE. Do you feel the present situation calls for somebody with the authority of a czar in the field of research and development? And would you distinguish between research and development and production?

Dr. BUSH. Well, to answer the second question first, most decidedly I would. They are very different things, and they have to be treated in a vastly different manner. I would not recommend at the present time a civilian organization outside of the Department of Defense carrying on military development. It is a very different thing in wartime from what it is in peacetime, for many reasons.

For one reason, in wartime the services are so busy with the immediate job of fighting the war they do not have time or the personnel for development, and if it is going to be done at all it has got to be done outside.

In the second place, the development of a weapon calls for many steps, research, engineering, finally production, experimental tests in the field, training, many aspects which are first civilian and then military.

It can be carried on only by the closest of cooperation between the developers and the military who will use the results.

In time of war, that cooperation is almost automatic, because cooperation between people in time of war occurs spontaneously.

In time of peace, I do not believe that a separate organization, outside of the Defense Department, engaged in developing military

weapons could be appropriately linked in with the military structure for collaborative work. I think that coordination had better be done within the Defense Department itself.

Senator CASE. That is all, Mr. Chairman.

Thank you.

Senator JOHNSON. Thank you, Senator Case.

Senator BUSH.

Senator BUSH. Dr. Bush, because of my great admiration for your many accomplishments and contributions to our national welfare, I have long tried to establish a blood relationship with you, but after hearing you today, I am sorrier than ever that I have been unable to do that.

But I want to for a moment, raise just one question, the same as I raised with Dr. Teller, and that goes down to the field of elementary and secondary education.

I think possibly you heard the great emphasis which he laid on that question, and I would like to ask you whether you share his views respecting our serious deficit at that level of education. And also if you would care to comment on anything that should be done, and particularly that we, the Congress, might do, to assist in curing that deficit.

Dr. BUSH. I most certainly do agree, sir. There is no doubt in my mind that we have got to do a far better job in our secondary education in the training of scientists.

We have a situation in this country today which is appalling. At the same time that Russia is doing a fine piece of work in inculcating its youngsters in science, we have a situation where there are many high schools in this country where there is not a single member of the faculty who ever studied science in any form.

We have a situation where the youngster who becomes interested in science has no place to turn.

I believe there is a great deal to be done. One thing, important, is that we need to increase the compensation of our secondary school teachers, where they are good teachers. And I believe very emphatically that we must in one way or another work out a merit system of compensation, that this cannot be a blanket increase for all teachers; that it must provide a way in which the really excellent teacher can acquire a better income, so that he will not be immediately attracted out into industry in order to be able to carry on his family in a dignified way.

I believe far beyond that, that we need to restore the high school teacher to a position of respect in his community. There was a time, when I was a youngster, when the teacher of science in the high school was regarded as a man of real stature in the town in which he lived. He was a citizen that was respected, that was regarded as one of the guiding individuals of the town.

We have slipped badly in that respect, and all too often it is said of such men today that they are teaching because they cannot do anything else, which is a calumny.

There are many good teachers in our high schools, who are devoting their lives to the cause because of their love of youth, and because of their love of teaching. And they are doing it in spite of the fact that they are underpaid, and they are doing it in spite of the fact that they are not given proper recognition in their community.

Let us at least restore those men who are doing a good job to positions of real respect.

DOES NOT FEAR PREJUDICE TO OTHER LEARNING

Senator BUSH. Do you think the science teaching profession could be singled out and should be singled out——

Dr. BUSH. I am afraid it has to be, Senator.

I deplore overemphasis on science at the expense of the humanities as much as any man, but I think we are so far from that condition that we are in no danger whatever of overdoing it for a long time to come, and that we can, with a clear conscience put our emphasis on getting good science teachers.

Now, there are many ways of going about it, and one way that I would recommend exploring is this. In the field of higher education we have perhaps 1,500 colleges and universities in this country. They differ enormously. There are specialized institutions, and there are institutions that are far more general. There are liberal arts colleges of small size; there are great universities.

In our high schools, we do not have that differentiation. In some of the large cities, we do to a certain extent, but I think we can carry it much further, and that in our cities of any size we could have special high schools, open to those students who have shown proficiency and earned the transfer, in which would be excellent teachers of science, and where science would be emphasized.

Senator BUSH. Just one final question on this point.

What do you think the Congress can do?

Dr. BUSH. I think if the Congress——

Senator BUSH. Sir?

Dr. BUSH. If the Congress is going to approach this field at all, I hope and trust that it will enter it without taking the control of the schools from the local communities in any regard whatever, for I am a great believer in having the schools run by those who are close by and who understand them.

But even without interference, I think the Congress of the United States might readily make funds available to any State or any community that would set up a special system of schools for the teaching of science in an advanced manner by excellent teachers, to which students would be admitted who showed a proficiency in science, with no control, but merely with the requirement that they meet that criterion and attempt that end.

Senator BUSH. In other words, that we should offer some subsidy for the establishment of such schools?

Dr. BUSH. That is the point.

Senator BUSH. Not take them over.

Dr. BUSH. Right.

Senator BUSH. Or furnish the whole subsidy.

Dr. BUSH. Right.

Senator BUSH. But to offer some special stimulation, financial aid, for the establishment of special schools in the elementary and high school levels for teaching science.

Dr. BUSH. That is right. That is one thing. There are other things, but that is one suggestion.

Senator BUSH. Well, I would simply say, in closing, I do not want to prolong it, but if you think about things that we should do, I hope

you will advise this committee as soon as possible, because I think this is one of the most important questions we shall have to deal with in January.

Dr. BUSH. Yes, sir.

Senator BUSH. I have nothing else.

Senator JOHNSON. Thank you very much, Senator Bush.

Senator Barrett?

THE SPUR OF APPRECIATION

Senator BARRETT. Thank you, Mr. Chairman.

Dr. Bush, I have been impressed with your statement here this afternoon. I was somewhat surprised at your suggestion that scientists worked well when they are playing to an audience, that they really look for the appreciation of the people in their communities and of the country as a whole.

I have in mind that people generally over the country are well acquainted with the great service you have rendered in the scientific field, and Dr. Teller and several others in that respect, but there are a good many of unsung heroes in the scientific field, and I was wondering what you would think about a congressional scientific medal that might be awarded by the National Science Foundation for those men.

Dr. BUSH. Perhaps I did not express myself well, Senator. What I had in mind was this, by that expression of mine.

I think scientists are primarily interested in doing a good job; that they are in general not very much interested in monetary reward if they can live reasonably. They do not care too much about popular acclaim. That is not the kind of thing they want.

But they do like to feel that their work is appreciated by those who understand it, and particularly by their colleagues, by their peers in science and, beyond that, by the members of their community, those that they mix with.

If they mix with individuals who say, "Oh, well, this man is a scientist; I have got nothing to do with him," it is disheartening.

But if they mix with people who are interested in science; anxious to know more about it, who appreciate its importance as a cultural affair as well as a practical affair, they work better as everyone does when his work is appreciated by those who understand him.

On the matter of a medal, I will have to admit I am exceedingly skeptical on the matter of medals. I think sometimes they can do a great deal of good when they can be given to a young man just beginning to make his way, as a token that those who had gone further recognize him and feel he has done a good job.

But in general, the subject of medals I think is overdone, and I believe that there are far better ways in which this Congress could show its appreciation of scientific work.

Senator BARRETT. What would you suggest as a better way?

Dr. BUSH. Well, for one thing, if you want a specific example, the National Science Foundation was set up to further basic scientific work in this country. Before the war we lagged behind Europe on basic scientific work.

Since the war, we have done better. We by no means do enough at the present time in basic science, in fundamental science. We

have come nearer to taking our proper position in the world in that regard, but we still need to do far better.

So I would say to you, having established the National Science Foundation, by all means support it so that it can do a thorough job.

Senator BARRETT. That is all.

Senator JOHNSON. Thank you very much, Senator Barrett.

Counsel, do you have any additional questions?

Mr. WEISL. No, sir.

Senator JOHNSON. Does any of the Senators have any questions?

BASIC RESEARCH INDISPENSABLE

Senator CARROLL. Mr. Chairman.

Senator JOHNSON. Mr. Carroll of Colorado, who is not a member of the committee, but we are delighted to have him here, and we are urging him to participate.

Senator CARROLL. Thank you, Mr. Chairman.

I have been visiting the scientists in the Bureau of Standards out in Colorado, they have told me, substantially what you have testified to here today, except they have divided the missile program into two parts.

I understand that you have said that you are an engineer, not a scientist. They say the first part of the missile program is really an engineering program.

Their great criticism is our lagging behind in basic research, and these men—I understand there are 300 or 400 scientists out in that Bureau, and they have a feeling that their appropriations and their contracts that come from the military are subject to change and while they are utilizing the scientists, they will get into a program and then get pulled out of it again, and sometimes it will take 3 years to do a basic research job as a result of this uncertainty.

That leads me to the question: Which do you think, to use the comparison, is most important, the missile development or basic research?

Dr. BUSH. Well, you cannot do one without the other. When the program on atomic weapons started, there was involved in it fundamental science of the most basic sort, then applied science, engineering, and finally production.

Now, the same thing is true of the missile program. We could not be at our present position today if there had not been a great amount of basic research, fundamental research, on fuels, on the guidance systems, on the performance of gyroscopes, on many subjects of that nature; if there had not been the application of applied research that took these things out of the laboratory and began to approach them in an economic manner to see what could be done with them, and if there had not finally been engineering and design for production and all the rest.

Senator CARROLL. In other words, the basic research was first. Do you now agree it is an engineering problem?

Dr. BUSH. In the missiles field, the primary job of the missiles field today is an engineering problem. But by no means let us stop our basic research, for the missiles that we have in mind today are not the last missiles that will be produced, nor the most effective ones. And we wish to have the best missiles, not 5 years from now, but also 25 years from now.

Senator CARROLL. Doctor, I completely agree with you, and from the statement of those scientists to me in Colorado, they make this further statement: that had it not been for Sputnik No. I, their appropriations would have been cut off in basic research. As a result of that happening, there has been a great awakening, and some of the basic research programs have been reestablished, but such programs are still dependent upon military contracts.

And I think MIT is the, whether I say the originator, at least they are the contracting agents. So you would certainly say that basic research is a vital and important part of our scientific advancement?

Dr. BUSH. Well, I am chairman of the board of MIT, but I didn't know that particular detail. I did not realize they were the contracting agency on the missile program.

Senator CARROLL. No; this is on basic research.

Dr. BUSH. Oh, yes.

Certainly this is true, gentlemen; we have had in this country a great distrust of scientists since the war. We have called them eggheads and highbrows. We felt they were not to be trusted.

We have occasionally pilloried them in our attempt to preserve secrecy.

A large part of that goes back to our smugness, it goes back to our overconfidence, to our egotism. Well, we felt that if we were way ahead of the world, could just preserve our secrets, all would be well.

I hope and trust that we have now matured, and that we can see the thing in a more clear light, and realize that we are in real competition where we probably have as many secrets to learn as we have to lose, where overemphasis on that sort of thing is infantile.

I hope that we have come to the realization that we must no longer depend upon Europe for our basic research; but that we must have in this country, in every field, important basic research of the first water, of which we can be proud.

We must acquire that position if we are to preserve our national self-respect.

ARE YOUNG SCIENTISTS UNDULY RESTRAINED

Senator CARROLL. Just one further question, Mr. Chairman.

I have been led to believe that, from my discussion, these are younger scientists, Doctor, they think that the scientists of the National Science Foundation, and perhaps the Academy of Sciences, have been a little bit conservative, and these young scientists feel they are not being fully utilized.

Would you say that their lagging behind in this program is a failure to utilize our scientists? Is there a shortage of scientists that causes it?

Dr. BUSH. Well, there is a shortage of scientists, all right, and it has been very clearly pointed out to us if we do not get busy about it, our shortage of scientists vis-a-vis Russia is going to get much worse in the future, certainly.

Now, on this matter of the young chaps, don't worry about the young scientists. They always chafe at control, and I hope they always will. Most of our production of forward-looking science is done by the younger men. I am very glad that they are restless. If they were not, I would feel sure something was wrong. If they are any good, they will always be restless.

Senator CARROLL. Well, the opinion they expressed to me, Doctor, was that they felt that their appropriation, coming from the military—and this sort of fits in with what Senator Kefauver said—that the military many times would give an appropriation for basic research; they would get halfway through with it and would be pulled out of it because it was not fast enough for a military project, when many times the basic research might take 3 years, and that is why I wondered if, perhaps, we are fully utilizing our scientists and their own ability in the field of science.

We talk about the military. We have talked about these other agencies. And if Colorado and the Bureau of Standards is any criterion, it seems to me—if they are correct—they claim they are not being fully used, and I ask you to think about that as you think about the question that Senator Kefauver put.

Senator JOHNSON. Are there any other questions by any other Senator?

Dr. Bush, as I said when you appeared earlier today, once again the country has turned to you for advice and counsel in time of crisis. And, as always, we have found your ideas challenging and stimulating and interesting. You have raised an issue that is basic to this whole problem, and that is the form of our military structure.

This is one issue which has troubled thinking people for many years, and there is no simple answer to it, but the necessities for an answer become increasingly apparent.

This is not a question which can be settled overnight, but it is, obviously, something to which the Congress will have to give careful thought and attention in the days that lie ahead. And I am going to attempt to see to it that that is done.

Dr. Bush, you can look back upon a long life in which you have served your country in both war and peace. Your name is one of the most eminent of our scientists or engineers who have kept our level of technology high. Your contributions have been many, and the testimony which you gave us this afternoon has been on the same high level of all of your past services to this Nation.

You addressed yourself to the basic issue—what is to be done?

I want to point out that I am sure, before these hearings are concluded, we will go into budgets, we will talk about appropriations; we will review what the Congress has done and not done, what the Executive proposes and what he disposes.

But, without getting into the dollars now or the budget now, the physical situation now, the chairman of this committee is going to insist that each witness say, in as plain, simple terms as possible, where he who listens can hear, the answer to one simple question: What can be done?

And, Dr. Bush, on behalf of the committee and on behalf of all Americans, I want to express to you my deep gratitude for your constructive contribution. You and Dr. Teller have made this a very unusual day, even in the life of the Senate. Thank you, sir.

Dr. BUSH. It has been a pleasure to be with you, sir. It seems like old times. I have had many a pleasant session here on Capitol Hill, and to be associated with you gentlemen in this crisis is not only a duty and a privilege, but, I can assure you, a rare pleasure.

Senator JOHNSON. Thank you, Doctor.

Senator SALTONSTALL. Mr. Chairman.

Senator JOHNSON. Senator Saltonstall?

Senator SALTONSTALL. Might a Massachusetts man say, Mr. Chairman, that we are mighty proud of the Massachusetts Institute of Technology, and the men who produced it, and Dr. Bush is one of its leaders.

Senator JOHNSON. Dr. Bush, we have this problem: I have to go back to Texas to campaign to get reelected, to see my constituents. Senator Saltonstall can just sit here at the table and hear his constituents all day.

TESTIMONY OF JOHN CHIPMAN, CHAIRMAN, DEPARTMENT OF METALLURGY, MASSACHUSETTS INSTITUTE OF TECHNOLOGY

Senator JOHNSON. The next witness is the distinguished Dr. John Chipman. For the information of the press, we plan to ask Dr. Chipman to testify this evening. We trust that it will take somewhere in the neighborhood of an hour's time, maybe a little longer, but not much longer, if members will keep their questions brief. We expect to conclude today's hearings with the testimony of Dr. Chipman.

Tomorrow we will begin with Dr. Hagen, General Doolittle, and then Mr. Allen Dulles and his entire staff will be in executive session. I expect they will come on in a 1 o'clock session tomorrow afternoon.

We may get to Secretary McElroy tomorrow. I doubt it. He will be standing by.

Secretary McElroy, if we don't get to him tomorrow, will come on Wednesday morning, to be followed by Under Secretary Quarles and Mr. Holaday.

We plan to conclude this part of the hearings on Wednesday. The staff will then proceed with its investigations and studies and its interrogations and prepare an agenda for the hearings to begin on the 13th of December.

Thank you, Dr. Bush.

Dr. Chipman, will you please come forward?

Will you raise your right hand, please?

Do you solemnly swear that the testimony you will give this committee will be the whole truth and nothing but the truth?

Dr. CHIPMAN. I do.

Senator JOHNSON. Dr. Chipman, the committee takes a great deal of pleasure in calling you as its next witness.

Dr. Chipman is chairman of the department of metallurgy at the Massachusetts Institute of Technology and one of the leading experts in this field.

For the benefit of the record, Dr. Chipman is a native of Florida. He received his bachelor of science degree from the University of the South in 1920, his master of science degree from the State University of Iowa, 1922. He was awarded a doctor of philosophy degree by the University of California in 1926, and his doctor of science degree by the University of the South in 1940.

Dr. Chipman's career includes service as an associate professor of chemistry at Georgia School of Technology and as a research engineer for the University of Michigan. From 1934 to 1937, he was associate director of the research laboratory for the American Rolling Mill Co.

In addition to being a distinguished scientist, Dr. Chipman is in possession of fresh information about the Soviet Union. He has recently returned from a trip to that country, where he had a firsthand opportunity to observe some of its production and research facilities.

Dr. Chipman, the committee is honored to have you with us today, and we are very happy you have agreed to come here and make this contribution.

Mr. Weisl, will you proceed with your examination?

THE BOUNDARIES OF METALLURGY

Mr. WEISL. Dr. Chipman, will you please briefly describe the science of metallurgy?

Dr. CHIPMAN. I would be happy to do that.

Metallurgy is probably best rated as engineering rather than science, though it is based heavily in science also.

As an engineering field, it has responsibility for two major things: One, the extraction of metals from the ores, refining them, making them useful. This embraces such industries as steel, aluminum, copper, titanium, other metal producing industries.

On the other hand, metallurgy also has responsibility for the intelligent use of metals, the application of the right metal to the right spot, the development of new alloys where no alloy exists to do the job.

Mr. WEISL. Would you be kind enough, Dr. Chipman, to tell us the part that metallurgy plays in the manufacture and use of defense weapons, including missiles?

Dr. CHIPMAN. Now, sir, I am no authority on missiles, nor on any other defense item at the present moment. Metallurgy has contributed to many such defense items as, for example, the bombs which we used in the past war, the atomic bombs, which were used.

Metallurgy has contributed much to further development at Los Alamos; and Oak Ridge has very active metallurgy sections, and the whole development of high-temperature metals for all conceivable uses where high temperatures are involved is a metallurgical problem of the first magnitude at the present time.

Mr. WEISL. That is particularly important in the reentry problem of the intercontinental ballistic missile, is it not?

Dr. CHIPMAN. This will fit, it is important in such items also as gas turbines, jet engines, missiles, too, I have no doubt.

Mr. WEISL. You visited Russia in June and July, did you not?

Dr. CHIPMAN. I did.

Mr. WEISL. What particular plants or institutions did you visit?

Dr. CHIPMAN. I went over to attend a metallurgical conference. There were only a few people invited from outside the Russian sphere. I was fortunate to be one of these.

I was invited, I believe, because a former student of mine was the chief organizer of this particular meeting. He made it a point to take me personally to visit a number of their steel plants.

I was quite well impressed by these plants. If I may, I would like to tell you about two of them.

Mr. WEISL. Where were they located, Doctor?

Dr. CHIPMAN. One was located a hundred miles from Moscow. This is a small plant, an old plant. The thing that impressed me

there was that the whole steel plant is used for research and development, for developing new ideas in how to make steel.

It is a small plant. It was all devoted to that.

Mr. WEISL. Is it manned by scientists?

QUALITY OF METALLURGICAL ENGINEERING

Dr. CHIPMAN. It is heavily staffed by scientists; yes; and habituated by visitors from the Academy of Science and other research laboratories.

The other plant which I might like to mention is a modern new plant at Magnetogorsk. This is out in the Ural district, they call it the Ural Mountains, but there are no mountains in sight.

It is out on the Siberian Plain. Magnetogorsk has beside it quite a hill of fine iron ore which they are mining and handling very intelligently.

Their metallurgical engineering, as exhibited in this plant, is as good as you will find in this country or in any part of Europe.

They have done an outstanding job, and have applied very sound engineering principles to the problems of design and operation of this plant.

Mr. WEISL. Were you able to discuss freely problems with the staffs in these plants?

Dr. CHIPMAN. Yes; we were.

They did not hold back on any questions regarding the plant. They took us to all parts of the plant we wished to see, and we then sat down and they answered all of the questions we wanted to ask them.

They, in turn, had some questions regarding American steel industry, which we were happy to try to answer for them.

Mr. WEISL. Did you find those plants modernly equipped?

Dr. CHIPMAN. This fairly new plant at Magnetogorsk is very modernly equipped. They have 8 blast furnaces there, 4 of which would rate as about the biggest in the world, as big as our biggest, and as productive as our biggest.

This productivity is achieved by the application of straightforward fundamentals of engineering.

Mr. WEISL. How do these plants compare with American steel plants?

Dr. CHIPMAN. They compare on a par with American steel plants, by and large.

I should say in respect to electric furnaces, I saw nothing that could quite compare with what you can see in this country in electric furnace steelmaking, but in blast furnaces and open hearth furnaces which constitute the backbone of the steel industry, the plant at Magnetogorsk seemed to me to be as good as anything we had.

Mr. WEISL. Was research conducted at that plant also?

Dr. CHIPMAN. Yes; the plant has an active research department which is busy in the solving of immediate plant problems. The steel industry itself supports a number of research institutes in various parts of the country and the more fundamental research is done in these institutes.

SOME OF EQUIPMENT BETTER THAN OURS

Mr. WEISL. Did you visit any research laboratories?

Dr. CHIPMAN. Yes, sir, we did.

Mr. WEISL. Where, sir?

Dr. CHIPMAN. We visited a number of the institutes. We visited two institutes which are supported by the Academy of Science, the Soviet Academy of Science. These turned out to be very excellent, research establishments. They have equipment some of which is beyond anything I can lay my hand on for my research work. They have staff many of whom we recognize by their works that we have been reading, many of whom have their international reputations.

These people received us in a friendly manner. They answered all questions that we asked, and we had quite frequent technical discussion with them.

Mr. WEISL. You felt that they held nothing back?

Dr. CHIPMAN. Now, we did not ask them questions which we thought would be classified. Neither did we encourage them to ask us such questions. We talked about the steel industry, basic research, of papers which they have published, fields of research which are open to public discussion the world over.

There was no holding back in such things.

They showed us also some of their newer developments of alloys that have not been published. We did not ask about defense items or about nuclear items.

Mr. WEISL. Did you study the training system or the educational system?

Dr. CHIPMAN. We had a good look at that. We visited four of their teaching institutes. We also visited the university but the university was closed for the summer and we did not see anyone there to talk to.

But in the four teaching institutes that we visited, we did see the people, the professors who were doing the teaching.

We learned that a metallurgist in Russia enters a research institute from the high school at the age of say 17 or 18, and he has a 5-year curriculum or a 5½-year curriculum in some cases as contrasted to our usual 4-year curriculum.

The first 3 years of this curriculum are not too different from our first 3 years. They are pretty broad basic studies of science, and engineering fundamentals, and as I looked over their programs, they looked good, to me, for the first 3 years.

Now, the last 2 years are very different from our type of education. The student specializes very narrowly in a field, for example, ferrous metallurgy, that is iron and steel, or nonferrous metallurgy, involving other metals.

But he specializes more closely than that. If he is a specialist in iron and steel he can specialize more intensively in blast-furnace or open-hearth or electric-furnace steel or in steel rolling, or in steel casting.

This is the sort of specialization which we do not recommend, and do not follow in our schools because it partakes so largely of the nature of job training.

Now these Russian metallurgists, when they graduate with a diploma, are given jobs in the industry for which they have specialized,

and I have no doubt at all but what they are better equipped for that specialized job than our own graduates would be for that job.

PROCESS OF SELECTION

Mr. WEISL. How are these metallurgic students selected?

Dr. CHIPMAN. They come out of the high schools and take competitive examinations. There are about 4 or 5 applicants for each that is admitted to the metallurgical institute.

I am speaking here of metallurgical institutes, because it was these institutes that we studied closely. We assume that somewhat similar situations exist in other fields, but it is hard to believe that there are 4 or 5 applicants for every possible opening throughout the educational system.

Mr. WEISL. How is the tuition provided for these students?

Dr. CHIPMAN. There is no tuition charged in any of the institutes.

The students, on the other hand, receive a stipend for attending. A freshman goes in at 300 rubles per month stipend.

Mr. WEISL. That is the equivalent of about \$75 a month.

Dr. CHIPMAN. Something like that. It is bare subsistence, and he has a cheap room and cheap meals provided by the institute. In his second year he is promoted, he gets an extra 50 rubles a month, and by the time he is a senior he is drawing down 600 rubles a month. If he comes back as a graduate student, after 2 years in industry, he has a stipend of a thousand rubles a month.

Mr. WEISL. Did you learn what the teachers were paid?

Dr. CHIPMAN. The teachers are well paid. We learned that, but I do not recall the figure.

Mr. WEISL. Did you learn that their salary was on a par with teachers similarly situated in this country?

Dr. CHIPMAN. They are on a par with the best in this country, I think.

Mr. WEISL. And when a student graduates and is placed in industry, have you any idea what salary he receives?

Dr. CHIPMAN. Yes, he goes in at about a thousand rubles per month. His foot is on the bottom rung of the ladder.

Within 4 or 5 years he will be getting 4,000 or 5,000 rubles per month.

Mr. WEISL. And that is the equivalent, as I recall, of about \$1,250 a month in our money?

Dr. CHIPMAN. Something like that.

VISITS WITH CIVILIANS

Mr. WEISL. Did you visit any of the civilians, people other than scientists or students in Russia?

Dr. CHIPMAN. We visited a number of museums, art galleries, churches. We even went to church in a very active church of the Russian Orthodox faith and that was an interesting experience.

Mr. WEISL. Was the church well attended?

Dr. CHIPMAN. Not well attended; no, mostly old people. There were perhaps—well there were quite a few monks in the place and we were received very hospitably, we were introduced to the archbishop by our guide and he personally took us in to see this cathedral. We

visited a number of other things one of which I would like to mention to you.

There was a Boy Scout camp—rather a Boy Scout-Girl Scout camp. They call them Pioneer camps in Russia. We went because the son of our guide was there and we had a day to spare. It turned out to be very interesting. They have 450 children in this camp. Soon, shortly after we arrived, they finished their rest hour after lunch and came out to report all present and accounted for in formation and the director of the camp introduced me and my companion to them as visiting American scientists. They were not scared of us. They did not throw bricks at us. They did not even look cross at us. They were friendly. The appellation "American" was not something that they distrusted. They gathered around us and asked questions.

Through my companion who speaks a little Russian and our interpreter who did a good job they asked us questions about American children. Did we have any children? Well, why didn't we bring them with us? What do American children play? How do they live, and so on. These children were as friendly as they could be. There was no hint that they had ever heard any anti-American propaganda. I was impressed by this. I wondered how a bunch of our Boy Scouts would receive a couple of Russian visitors.

Mr. WEISL. You felt they were friendly, were not suspicious of you?

Dr. CHIPMAN. Friendly far beyond anything I would have expected.

Mr. WEISL. And they were very much interested in the United States?

Dr. CHIPMAN. Quite so.

Mr. WEISL. And our people?

Dr. CHIPMAN. We found this friendly interest everywhere we went, I might say. We expected this more or less among our scientific colleagues, but there was no evidence of hostility toward American visitors at any point.

Mr. WEISL. No hostility anywhere?

Dr. CHIPMAN. Nowhere.

NEW STEEL PLANTS GOOD AS ANY

Mr. WEISL. From your observation, Dr. Chipman, what conclusion would you draw as to the status of the Russian steel industry?

Dr. CHIPMAN. The Russian steel industry is smaller than our own; it is growing fast. It has very competent leadership, and the planning, I think, is sound. The new plants that they are building are as good as you will find in the world.

Their rate of growth proportionately, I believe, is a little greater than ours, and they have no recessions.

Mr. WEISL. Have you any idea what percentage of their steel industry is devoted to war purposes?

Dr. CHIPMAN. No, sir; no idea whatever.

Mr. WEISL. Could you deduce or give us some idea of how much of it is devoted to war purposes?

Dr. CHIPMAN. We saw in the plants that we visited nothing that looked warlike at all.

Mr. WEISL. But could you see from your observation of the country that very much steel was used for purposes relating to heavy industry or to the war?

Dr. CHIPMAN. This is right. Much of their steel goes to mining equipment, metallurgical equipment, new steel plants, new plants of other kinds. Undoubtedly some of it goes into war plants; we would not have been taken to see such things. We had no opportunity to see it and we did not.

Mr. WEISL. Did you observe the transportation system of Russia during your visit?

Dr. CHIPMAN. I suffered under the transportation system of Russia. From Chelabinsk to Magnetogorsk is 180 miles, 13 hours by train. The transportation system is not very good. I understand that the Trans-Siberian Railway is very busy with a train every 15 minutes, day or night. This is what my Russian friend told me. But our little experience with the transportation industry leads me to believe that they have a long way to go in passenger transportation.

Mr. WEISL. Then you would say very little of their steel is used for transportation?

Dr. CHIPMAN. I think much of it has been used for improvements in the Trans-Siberian Railway. I know that some extensions have been made in the Far East in that railway, and this certainly must have taken a considerable amount of steel.

Mr. WEISL. Do they supplement their rail transportation with roads?

Dr. CHIPMAN. The roads system is worse than the rail system. Around Moscow, for 30 or 50 miles in either direction are good roads, but the cross country roads are pretty bad.

Now, I would like to make one other remark, that if the Russians have any control of weather, they were not exercising it when we were there. [Laughter.]

The roads, some of the roads that we encountered were hub deep in mud, plain old mud. It had been raining considerably more than they wanted, and this is like Illinois roads were 40 years ago exactly. They are that far behind us in the general highway system.

PEOPLE IN THE COUNTRY POOR

Mr. WEISL. Could you tell us something about the standard of living of the average person in Russia?

Dr. CHIPMAN. This would be hard to judge directly, because we did not go into any average home.

The standard, if one can judge by the external appearances of their houses, is very, very low.

These people are poor. The people out in the country are poor. They have little houses, they have little garden plots, their clothing, everything shows that they are poor.

The people in the cities are better off. Many of the old log houses of the cities are being torn down in favor of new and big apartment houses, but the individual apartments in those houses are very, very cramped.

So that living conditions, the standard of living is away low by our standards.

HEAVY GROUNDING IN MATHEMATICS

Mr. WEISL. Is there anything further you would like to state, Dr. Chipman, about their research laboratories, their research development or their research program?

Dr. CHIPMAN. I think I would like to point out some things about their educational system.

The kids that go into the teaching institutes, the metallurgical institutes or the university, they have had in their preparation mathematics all through their lower grades in high school.

They have had at least 3 years of chemistry and physics each. They have had some biology. They have had modern languages, many of them have studied English for 5 years.

English is the popular language with them, and 80 percent take English.

Mr. WEISL. What percent?

Dr. CHIPMAN. Eighty percent take English. This is carried along into their high schools, also.

Their educational system in the institutes of college grades, as I pointed out, is too specialized for our American needs but I think it fits their needs probably quite admirably.

Mr. WEISL. Is there anything more you think you ought to tell us about your visit, Dr. Chipman?

Dr. CHIPMAN. Well, I should mention the Academy of Sciences since Senator Symington brought it up. I had the pleasure of meeting the vice president of the Academy of Sciences. He is an engineer. He tells me that the plans that are made for industrial expansion are all acted upon by a committee of the academy before they go into the overall planning of the country.

The academy is a very powerful institution. It is nonpolitical in any aspect, and it is staffed with scientific people. There are not very many members of the academy. It is quite a select group. I think 150 or 200.

They have about 300 or 350 corresponding members, who are non-political, they are scientific people, recognized for their own scientific work, and are really the scientific leaders.

This Academy of Science runs a number of institutes. You read it to us out of the book. The figure that he gave me for the total number of employees now is 50,000 employees. This is a formidable group of people.

Senator SYMINGTON. If counsel will yield to me just at that point. I think the 21,000 figure I mentioned was 1949.

Dr. CHIPMAN. It has grown since that time.

Senator SYMINGTON. I think, Mr. Chairman, those are all the questions I care to ask.

Senator JOHNSON. Dr. Chipman, is it your belief that Russia can continue or even increase its rate of progress in science and technology?

4500 METALLURGY GRADUATES TO OUR 650

Mr. CHIPMAN. I think undoubtedly they will.

Now in my own little field of metallurgy, let me tell you why. They are turning out on the average 4,500 a year of diploma graduates in metallurgy. That does not sound like a big number in all engineering but metallurgy is a specialty and there are other engineering specialties which are no doubt commensurate or bigger but compare it with our production of 650 metallurgists per year.

Senator JOHNSON. How many?

Dr. CHIPMAN. 650.

Senator JOHNSON. 4,500 and 650.

Dr. CHIPMAN. That is the ratio. This frightens me.

Certainly they can continue to advance, and the rate of advance will increase with this output of well-trained people.

Senator JOHNSON. Were you able to observe the degree of scientific and technological achievement in fields other than that of your own, metallurgy?

Dr. CHIPMAN. No; I was not. We did not get into other fields.

Senator JOHNSON. Before I conclude the questioning, I want to ask you what would be your recommendation to this committee as to what can be done about this crisis in which we find ourselves.

Dr. CHIPMAN. I know nothing about weaponry. I know nothing about rockets. I know something about basic research, and I know that it needs more support than it is getting at the present time, basic, long-range research, the kind of research where you do not know the answer when you start out.

The kind of research on which you are willing to gamble. You may get nothing or you may get something extremely valuable. The sort of research that has been sponsored in a very laudable manner by the Office of Naval Research, who have been a very intelligent agency in placing fundamental research contracts with the universities.

This sort of research needs further strengthening immediately. There is a twofold thing to be gained there, not only the increase in fundamental knowledge which comes from this sort of research, but the even more valuable aspect that this is the training ground for the graduate student in science, the student who is working for the master's degree, the doctor's degree in all fields of science, this is the training ground for that student, and we need to multiply the number of such students well above what we have at the present time.

We need also to multiply the number of undergraduate students in the sciences so that industry can be better served, and so that research can be better served by having the larger pool to draw upon.

In order to do this, we need to go back into the high schools. As Dr. Teller and Dr. Bush have both said so eloquently, we need to strengthen the science in the high schools. How do we do this?

Well, first we get some teachers who can teach science in high school. We need to improve not only the number but the quality of the high-school teachers of science.

And we need to go back further into the junior schools and lower grades and get these youngsters science conscious, get them off on the right foot so that when they get up into the high school they have enough mathematics to handle scientific study.

From my standpoint and from the basis of my beliefs, I think our educational problem is as acute as our missile problem and it is something that is going to be worse for a long, long time.

If we are to have missiles of the future, we must have education of the present.

RUSSIANS WORK 6-DAY WEEK

Senator JOHNSON. Doctor, I have been greatly impressed by your recitation of your observations. I wonder if you could tell the committee whether your impressions of Russian efficiency and their capacity and their ability were increased as a result of your visit.

Did you find more than you expected to?

Would you elaborate a little bit on that?

Dr. CHIPMAN. We found more in science than we expected to. I would not say we came away with any high regard for Russian efficiency, by and large. They have a cumbersome sort of system and the ordinary little things that are so simple to do here in this country take them a long time to do.

They work a 6-day week. That is the natural thing. Their week-end begins at 4 o'clock Saturday afternoon. They are a hard-working people. Their scientists are on the job; in fact I think the Russian people, as I saw them, were pretty hard-working people, by and large.

Senator JOHNSON. Thank you, Doctor.

So your basic recommendation is that we give increased attention to stepping up and increasing our basic long-range research.

Dr. CHIPMAN. And our education.

Senator JOHNSON. Senator Saltonstall?

Senator SALTONSTALL. Just one question, Mr. Chairman. I thank you.

Dr. Chipman, you certainly gave us a very interesting and illuminating discussion of your visit. My one question is this:

You have said in answer to Senator Johnson's question that basic research and education should be stimulated in this country.

What should the Federal Government, as such, in your opinion, do to stimulate education and basic research?

Dr. CHIPMAN. There are probably two different things. There was a bill for stimulating education a year or two ago, I believe, which had the endorsement of several very fine people. This bill encountered difficulties in the Congress and was never passed. Something like that should be reappraised.

I believe there was some difficulty that some people did not want any money to go to segregated schools. Perhaps that was a difficulty. We need the education, whether it is segregated or not, and they are two different questions.

We need those youngsters. We need for them to have good educations, and the opportunity to go into scientific work if they so desire.

So that is something that could be looked at educationwise. I do not know how one tackles a question of education from the political standpoint. I only know that the school systems everywhere need strengthening, and the more this can be done on a local basis, the better off we are.

But national leadership in pointing the way to that would be very helpful to all local communities.

From the standpoint of stimulating research, the National Science Foundation should certainly be enlarged and its budget increased—I do not pretend to know how much—but it could be doing 2 or 3 times as much as it is doing.

This, I think, without taking away from the services such valuable going concerns as the Office of Naval Research, the Atomic Energy Commission's plan of aid to the universities, and things of that sort, which are an extremely important part of our current higher education efforts.

Senator SALTONSTALL. Thank you, Mr. Chairman.

Senator JOHNSON. Senator Kefauver?

Senator KEFAUVER. Thank you, Mr. Chairman.

COMPARISON OF TECHNOLOGIES

Dr. Chipman, how many steel plants did you visit in the Soviet Union?

Dr. CHIPMAN. We visited four.

Senator KEFAUVER. Did you find they had any better technology than we did in this country?

Dr. CHIPMAN. No. It is more adapted to their needs, and different from ours. It differs in respects which you might consider minor and which are based on economics of the situation.

They are very scarce of coal of coking grades, so that all of their designs are aimed at minimizing the amount of coke required.

Senator KEFAUVER. Do they have continuous casting?

Dr. CHIPMAN. Yes, they do. We saw this in operation. They did not hold it back from us. They told us that they expect to be casting 12 million tons continuously in the next 3 or 4 years.

Senator KEFAUVER. We had some information that they use oxygen converters and planetary rolling mills. Did you find that to be true?

Dr. CHIPMAN. The oxygen converter has not come into much use in Russia. They are very much interested in it, and have visited in Canada and Sweden where these things are used, to find out about it.

Perhaps it will come in, but they are short of oxygen plants. They would like to use oxygen, also, in their blast furnaces and in their electric furnaces. But the two big plants we have visited, they have not yet built an oxygen plant. They know the use for it, but they are behind in their oxygen requirements.

Senator KEFAUVER. Did they have any planetary rolling mills?

Dr. CHIPMAN. I did not see any.

Senator KEFAUVER. Are their mills comparable to the Fairless steel plant?

Dr. CHIPMAN. No. Their rolling mills are below our standards, I would say. Their blast furnaces and open hearths, on the other hand, are fully comparable.

Senator KEFAUVER. Thank you very much.

Senator JOHNSON. Senator Flanders?

Senator FLANDERS. Dr. Chipman, do I have the correct impression from you that the technical education in the metallurgical field is up to our standards except for the fact that we do not believe in specializing so early and so narrowly? Is that the only criticism you have of it?

Dr. CHIPMAN. This is the only valid criticism I have of it. I might question certain parts of it. I think they are weak in their teaching of thermodynamics, which happens to be a little hobby of mine, and things like that. But these are questions of opinion.

Now, they give as much effort to it, it is an intelligent effort, and their program as outlined is excellent. But there is this difference of high specialization which would not be adaptable to our conditions.

Senator FLANDERS. As to the results of that education in practice, you have mentioned that in steelmaking they are doing well, but on a somewhat different basis due to economic conditions.

But in general, would you say that their metallurgical practice is high? For instance, have they developed anything like the line of alloy steels that we have?

Dr. CHIPMAN. Yes. But they do not make them in the quantities that we do. I think they do manufacture a lot of alloy steels.

Senators FLANDERS. But make them by crucibles?

THEIR ELECTRIC FURNACES INFERIOR TO OURS

Dr. CHIPMAN. These are made by electric furnaces, some by the open-hearth method. There is no crucible steelmaking anywhere in the world.

Senator FLANDERS. You see, I am getting old. It used to be, when I was a boy.

Dr. CHIPMAN. Yes. That is electric furnace production now. The electric furnaces I saw were inferior to our own.

Senator FLANDERS. But in general, their education is good except for what you say, the criticism you made of the specialization, and their steelmaking is not as fully developed as ours.

Dr. CHIPMAN. The balance is a little different than ours, I would say, but steelmaking with respect to blast furnace and open hearth is fully as developed as ours.

Senator FLANDERS. The open-hearth process is as well developed as ours?

Dr. CHIPMAN. It is as well developed as ours; yes, sir.

Senator FLANDERS. Thank you.

I have no more questions, Mr. Chairman.

Senator JOHNSON. Senator Stennis?

Senator STENNIS. Dr. Chipman, I was very much interested in all of your testimony, and impressed with it. I will be brief on my questions, which will be partly repetitious or repetition, but I was not clear.

These 4,500 graduate metallurgists per year, did you say that their education was as complete as the 650 that we graduate per year, on the average?

Dr. CHIPMAN. It is not as broad, but it is deeper and goes farther in a given direction. It is much more specialized.

Senator STENNIS. What is the extent of their general education, their broad education, as compared to ours?

Dr. CHIPMAN. Well, now, they do not lay much store by the humanities. Their humanity subjects run something like this: History of the Communist Party for 1 year; economics for 1 year; philosophy for 1 year. That is about it.

On the other hand, they do teach modern languages, which we find difficult to find time to teach to our engineers, and they are definitely ahead of us in the teaching of languages.

Senator STENNIS. Definitely ahead of us?

Dr. CHIPMAN. In the teaching of languages; yes. All of their students learn at least one foreign language, and most of them learn English.

Senator STENNIS. Most do learn English?

Dr. CHIPMAN. Yes; and it is very hard to find a student in this country who is learning Russian.

EXTENT OF SOVIET GRADUATE STUDY

Senator STENNIS. Among the 4,500 who have appreciable creative ability, has it been given a broad field of expansion and development comparable with what we would have in our country?

Dr. CHIPMAN. I do not quite understand that.

Senator STENNIS. I say, those that have creative and special ability in that group——

Dr. CHIPMAN. Yes.

Senator STENNIS (continuing). Are they given their freedom to develop and continue upward?

Dr. CHIPMAN. Yes; they are. They can come back to the institute for graduate study. After 2 years in industry, they are eligible to apply to come back to the institute for 3 years of graduate study, which is good, broadly based scientific study, as far as I can learn. It is about equivalent to our doctor of science studies.

They get a degree from this which they call the kandidat degree, which is roughly equivalent to our doctorate.

These people do broad scientific research, and write a thesis on it, and in the field of metallurgy they have about twice as many of those fellows as we have of students taking the doctorates, about twice as many.

Senator STENNIS. So within that specialized field, then, you would judge that their education was about as complete as ours?

Dr. CHIPMAN. And much more numerous.

Senator STENNIS. Yes. I know you have a greater number.

Dr. CHIPMAN. Yes.

Senator STENNIS. But the individual is just about as well educated as our metallurgist?

Dr. CHIPMAN. Roughly speaking; yes.

Senator STENNIS. Did you find freedom of thought, freedom of belief, freedom of expression among the scientists, not only among the metallurgists but the others?

Dr. CHIPMAN. Among the scientists, we did. Yes; they were free to discuss various topics. We went over as their guests. We did not want to engage in any hot arguments with them, but we did get out of bounds occasionally, and they spoke their mind, rather confidentially, to be sure.

Senator STENNIS. Yes.

Well, the feel of the thing was that they did have their freedom, and they were free to develop?

Dr. CHIPMAN. They seemed free.

Senator STENNIS. To develop and to go up, as we say here?

Dr. CHIPMAN. And they seemed relaxed, also. They did not seem to be inhibited.

Senator STENNIS. They had the atmosphere that a scientist wants, then, professionally; is that correct?

Dr. CHIPMAN. Yes, they had. And they had some good laboratories and fine equipment in which to exercise this.

Senator STENNIS. I was impressed with what you said about the friendliness of the people, and I believe you told me at lunch that you found that friendliness at every level, and what you thought would be very genuine.

RECOMMENDATION FOR EXCHANGE OF STUDENTS

Dr. CHIPMAN. May I say another word about this?

Senator STENNIS. Yes.

Dr. CHIPMAN. On this same line?

Senator STENNIS. I wish you would, sir.

Dr. CHIPMAN. We had some visitors from the Soviet Union since we were over there, and, of course, having made contact through me, I was one of the chief people who had to entertain them and take care of them, make arrangements for them.

This I found very difficult to do, because the State Department prohibits them from going here and going there. They can just go to a certain number of places.

Once you learn the ropes, steer them into these places where they are allowed to go, they get along pretty well, but they have to be accompanied by an American citizen. They are held in by all sorts of things.

We do not fingerprint them any more, but we do insist on accompanying them.

Now, I walked around Moscow quite a little bit without accompaniment, and I suppose they can in New York, but if you go to somewhere else around the country, they have to be accompanied.

I was just thinking, and was talking with some of them, about what a wonderful thing it would be if we could get to know each other better as individuals and as human beings, because they are individually just as human as we are, and individually they do not think too differently from what we think.

I suggested a plan like this: "Wouldn't it be nice if we could exchange some students, you send some Russian students over and we will send some of ours over."

"Yes," they said, "this would be fine."

Well, we thought the graduate-student level, not to get the youngsters, but somebody at least of age, say a graduate of one of our places, someone who had maybe done a little bit of research in one of our laboratories, and exchange with one of their people on equal grounds.

"Yes," they said, "and we can send you people with the knowledge of English. Could you send us some student with the knowledge of Russian?"

"Well, no," I had to admit, I couldn't send them a student that could talk Russian.

"Well, that is all right," they said. "We will set up a chair in our university for teaching people Russian who come from foreign lands, and we can take care of them. We will pay them the same number of rubles that we pay our own graduate students," which is about a thousand rubles per month, "and we will take care of them."

I found if we want to consummate this exchange to bring someone over here, the restrictions set up are practically insuperable.

For example, at MIT, we couldn't do it because Massachusetts is a closed area to Russians with the exception of Cambridge, so it would be all right to have them in Cambridge, but it would not be all right to go across the bridge.

These things that impede the interchange on a purely nonpolitical level, which would be possible if we and they would give a little bit

here and there, and we could get to know each other a little better than we do.

I think this is important, because we have been talking here about deterrents, and I think our deterrents are going to work. We ought to be doing some planning on the hypothesis that our deterrents are going to work, and that we are going to still have cold war or commercial competition or something else, as far in the future as we can see.

We ought to be planning for that, and planning in whatever way we can to alleviate it.

Senator STENNIS. You think some better understanding, then, person-to-person and group-to-group, at the level of the people, would be the best deterrent in the long run, one that would work out?

Dr. CHIPMAN. I think if we could exchange a thousand students a year with them, in the course of 10 years or so we would exchange enough people so that viewpoints would be much better understood and friction would be much less.

Senator STENNIS. I thank you very much.

Thank you, too, Mr. Chairman.

Senator JOHNSON. Senator Smith?

Senator SMITH. I have not any questions, Mr. Chairman.

Senator JOHNSON. Senator Symington?

RUSSIAN EMPHASIS ON STEEL FOR DEFENSE

Senator SYMINGTON. Doctor, back in 1950, the United States had around 90 million tons of steel. The Russians were supposed to have 18 million. Some of us were trying to raise our steel capacity. There was opposition, on the grounds the Russians only had 18 million tons of steel.

Then we looked into it, and found they were putting 50 percent of their steel into defense effort, in their own country; whereas we were supposedly putting 10 percent of ours into defense. So it was 9 to 9, on that basis.

Then, in the National Security Resources Board, we checked and found out we were putting about 3 percent of ours; so they were putting 9 million tons into defense and we were putting in less than 3 million tons a year.

That was just before the Korean war. I understand now that, whereas our production capacity is 120 million, theirs has grown to 50 million; is that about right?

Dr. CHIPMAN. I think it is a little bit on the high side, but it is growing.

Senator SYMINGTON. What would you say it is?

Dr. CHIPMAN. I think it is slightly under that, but my statistics and my ability to remember statistics is a little poor.

Senator SYMINGTON. You were impressed with their metallurgical development?

Dr. CHIPMAN. Definitely, and their rate of growth.

PROGRESS ON ENGINE HEAT PROBLEMS

Senator SYMINGTON. It might interest you to know that one of the generals on the Twining Moscow mission a year ago last June, perhaps the best production man who went over, said that what he was the

most impressed with of anything he saw, was their metallurgical development. This except their plans for the education of youth.

Dr. CHIPMAN. Yes.

Senator SYMINGTON. In 1948 there was an argument between ourselves and another country about a jet engine, as to whether they had or had not sold that engine to the Russians. So, we asked the Chief of Staff of the Air Force, when we got our first MIG-15 what engine was in it. When we did shoot one down, we found it was that engine in the MIG-15.

The point about this is that General Vandenberg told me then, nearly 8 years ago, that they had worked out, in production, in their engine, some metallurgical problems we had not worked out in our laboratories.

Is that the type and character of development that you were referring to?

Dr. CHIPMAN. It could be. There are variations in the kinds of alloys you use in a high-temperature jet engine.

Senator SYMINGTON. Yes.

Dr. CHIPMAN. It is my impression from talking to the metallurgists there, they are using approximately the same type of alloys the British are using.

Senator SYMINGTON. Did you use the word "Bessemer?"

Dr. CHIPMAN. It is used.

Senator SYMINGTON. I mean did you use it a minute ago?

Dr. CHIPMAN. No.

Senator SYMINGTON. How do they make their steel? Mostly in open hearth, basic?

Dr. CHIPMAN. It is mostly open hearth basic steel.

Senator SYMINGTON. What are most of their alloys, electrical steel?

Dr. CHIPMAN. Electric furnaces.

Senator SYMINGTON. Did you see any of the furnaces?

Dr. CHIPMAN. Yes; we saw them.

Senator SYMINGTON. What were the largest sizes?

Dr. CHIPMAN. They were not to compare with yours. The largest size we saw was something like 15¹ tons. That is a small furnace today.

Senator SYMINGTON. Did you go into any foundries?

Dr. CHIPMAN. Yes; one foundry.

Senator SYMINGTON. Are they doing any permanent mold casting or sand?

Dr. CHIPMAN. No. There was ordinary sand casting, green sand casting.

Senator SYMINGTON. What you are really saying is that they are progressing but they are behind us in technology; is that correct?

Dr. CHIPMAN. In certain things they are behind us, but they are not one inch behind us in the blast furnace development.

Senator SYMINGTON. In the making of pig iron?

Dr. CHIPMAN. Blast furnace, which is the basic tool of the industry.

Senator SYMINGTON. You mean in the making of their pig iron?

Dr. CHIPMAN. In the making of their pig iron; that is right.

Senator SYMINGTON. Do they pour it into the open hearths liquid or solidify it?

Dr. CHIPMAN. They pour it in liquid.

¹ Later reference to notes indicates 30 tons. Still a small furnace.

LOW RATE OF STEEL PRODUCTS REJECTION

Senator SYMINGTON. Now, a general testified that when he was over there he saw a job we would put on a turret lathe, but they were doing it on a hand lathe. The worker said he had been doing this same job for 12 years. They had no inspector, because if one made too many parts wrong, they put their initials on them, they knew where they would go. He said, nevertheless, those parts from that old lathe went into the finest radial jet engine he had ever seen.

In other words, they make a good product. Is that what your opinion is?

Dr. CHIPMAN. They make good products. They do not reject much.

Senator SYMINGTON. They make a good product despite their relatively old machinery; is that it?

Dr. CHIPMAN. I suppose so. I had no opportunity to gage the quality of the machine product.

Senator SYMINGTON. I see. You just looked at the production of steel itself.

You talked to Senator Stennis about the nature of their training in metallurgy. You said, in effect, that they make the students specialize more—

Dr. CHIPMAN. Much more.

Senator SYMINGTON (continuing). In a particular part of metallurgy?

Dr. CHIPMAN. A very particular and rather narrow part of metallurgy, and they go into this in great detail, great lengths. They do a lot for those boys which we would expect our students to get after they have gone out into industry. But they expect this because their youngsters go into industry and are expected to fit into a job and know what they are doing. And they very soon become foremen and are promoted to superintendents. They do not promote anyone from the ranks. You have to be a metallurgical engineer in the steel industry in order to get to first base. There is no such thing as the office boy becoming president, or the steel roller becoming general manager. It does not happen.

Senator SYMINGTON. Did you see any of their sheet and strip mills?

Dr. CHIPMAN. There was one narrow strip mill.

Senator SYMINGTON. Automatic or hand?

Dr. CHIPMAN. Automatic.

Senator SYMINGTON. Of strip or sheet?

Dr. CHIPMAN. Strip.

Senator SYMINGTON. How about plate? Did you see any plate mill?

Dr. CHIPMAN. I did not see any plate mills.

Senator SYMINGTON. They must have a number of plate mills based on the number of tanks they build.

Dr. CHIPMAN. That is right.

Senator SYMINGTON. Did you see what you asked to see, or what they permitted you to see? A lot of people go over there, and come back impressed.

Dr. CHIPMAN. They asked us what we wanted to see, which was for us the steel- and iron-making facilities, the ore, the coke, the sintering, everything that goes into steelmaking.

Senator SYMINGTON. So you were interested in the pouring really, not in the rolling?

Dr. CHIPMAN. That is right; that is my chief interest, and that is why I saw it.

We saw a little of rolling. We saw some forging presses. But we did not attempt to go into that as thoroughly.

Senator SYMINGTON. Steel forging presses?

Dr. CHIPMAN. That is right. Regular forging presses. We saw at Sverdlosk a four and ten thousand ton press in the same plant.

Senator SYMINGTON. Thank you, Mr. Chairman.

Senator JOHNSON. Senator Case.

Senator CASE. Mr. Chairman.

Dr. Chipman, I noticed you referred to the types of plants that you saw, the steel plants. You said one of them was practically new.

Did you see any steel plants brought in from Germany during the dismantling period?

Dr. CHIPMAN. No, we saw none which were identified as such.

Senator CASE. In 1947, I was in Germany as a member of a congressional committee, and we made a report then on dismantling, and I remember one item was a large steel plant from Essen was being moved to Russia.

Dr. CHIPMAN. I know they brought in a lot, but we saw nothing.

Senator CASE. Your observation is now, at least, they are establishing plants on their own?

Dr. CHIPMAN. The things we saw were of Russian manufacture. If they had a nameplate on it, it was in Russian. This does not mean very much, of course. It is easy to replace a nameplate.

RECOMMENDS START OF EXCHANGE AT GRADUATE LEVEL

Senator CASE. I was very much interested in your remarks about the attitude of the Russian people and the students. It is entirely possible that in your observations on what will happen after our deterrents have worked and we have reached the stage where we do not get into war but we still have this long-range problem of living on the same planet, would you recommend a student exchange program below the high-school graduate level?

Dr. CHIPMAN. My thought is that it should start at the level of graduate students, people who have got their bachelor degree.

Senator CASE. People who have graduated from college?

Dr. CHIPMAN. People who are in the graduate school. That is to say, exchange of graduates, people perhaps working for a doctor's degree. That would be the level at which experimentation would be begun.

Senator CASE. Would you recommend a visit to Russia by every Member of Congress?

Dr. CHIPMAN. No, sir; I do not know that I would go that far. But it is quite interesting, I can tell you.

Senator CASE. Well, do you think it would be profitable for the average Member of Congress to personally visit Russia?

Dr. CHIPMAN. I think it would be very enlightening, yes. My own thoughts on the matter were considerably changed by my visit.

Senator CASE. That is all, Mr. Chairman.

Senator JOHNSON. Thank you, Senator Case.

Senator Bush.

Senator BUSH. No questions, Mr. Chairman.

Senator JOHNSON. Thank you, Senator Bush.

Senator Barrett.

Senator BARRETT. Just one question.

How many of the graduates in metallurgical engineering were girls?

Dr. CHIPMAN. It is about 20 percent at the present time.

Now, they think, the teachers that I talked to thought that this 20 percent is perhaps a little too high, but steps are being taken now to give preferences to students who have had 2 years of military service or 2 years of industrial experience, and they feel that this granting of preferences here to these 2 categories will undoubtedly diminish the proportion of women.

Senator BARRETT. Women, girls graduating over there in that type of engineering numbered more than all of the students graduating in that field in this country. I think you said it would be 900 for Russia, and 650 for the United States.

Dr. CHIPMAN. Your arithmetic is good.

Senator BARRETT. Were there any girls graduating in this country in metallurgical engineering?

Dr. CHIPMAN. Perhaps 2 or 3.

Senator BARRETT. Does that same percentage apply in all types of engineering colleges?

Dr. CHIPMAN. In engineering, I think it perhaps does. In the sciences, there would be a larger proportion of women.

Senator BARRETT. What is the reason we do not encourage the girls to go into that?

Dr. CHIPMAN. Pardon?

Senator BARRETT. I say what is the reason we do not encourage the girls to go into that type of engineering or any type of engineering?

Dr. CHIPMAN. I have never discouraged one from going into metallurgy. I do not know who does the discouraging.

Senator BARRETT. Well, we have not been successful in interesting them in that.

Dr. CHIPMAN. No, we have not. They are more likely to go into chemistry or biology.

Senator BARRETT. Thank you very much, Mr. Chairman.

Senator JOHNSON. Has counsel any further questions?

Mr. WEISL. No further questions.

Senator JOHNSON. Does any Senator desire to ask any other question?

Dr. Chipman, on behalf of the committee, I would like to express our gratitude to you for coming here and being helpful to us.

The hour is late and it is a tribute to your patriotism and to your desire to serve that you traveled so far to give us the benefit of your knowledge.

You have had a very unusual experience and you are in possession of what is probably the most precious information on an important segment of Russian industry. It is a segment which relates specifically to a subject of this inquiry.

The record we have made today is an excellent one. I think that this will be a very memorable day in the scientific life of our country. We have had an opportunity, at least for 1 day, for the scientists to take over a committee of the United States Senate and to speak to

this country and the people of the world and give them constructive suggestions.

Your contribution along with Dr. Teller and Dr. Bush has been of great importance to us. On behalf of the committee, I thank you, and I hope that we can feel free to call upon you from time to time as this study progresses.

Dr. Chipman, I think it is very safe to say that it is men of your caliber upon whom the future of this country rests, and I am very honored to have been in your presence.

Thank you so much for coming and being with us.

The committee will take a recess until 10 o'clock tomorrow, at which time we will hear Dr. Hagen, General Doolittle, to be followed in executive session by Mr. Allen Dulles.

The committee will recess at this time.

(Whereupon, at 6:30 p. m., the committee recessed to reconvene at 10 a. m., Tuesday, November 26, 1957.)

INQUIRY INTO SATELLITE AND MISSILE PROGRAMS

TUESDAY, NOVEMBER 26, 1957

UNITED STATES SENATE,
PREPAREDNESS INVESTIGATING SUBCOMMITTEE
OF THE COMMITTEE ON ARMED SERVICES,
Washington, D. C.

The subcommittee met, pursuant to call, at 10 a. m., in room 318, Senate Office Building, Senator Lyndon B. Johnson (chairman of the subcommittee) presiding.

Present: Senators Johnson (Texas), Kefauver, Stennis, Symington, Bridges, Saltonstall, and Flanders.

Also present: Senators Byrd, Smith (Maine), Case (South Dakota), Barrett, and Bush, members of the Committee on Armed Services; Senators Carroll and Dirksen.

Edwin L. Weisl, special counsel; Cyrus R. Vance, counsel; Gerald W. Siegel, associate counsel; Solis Horwitz, associate counsel; Daniel F. McGillicuddy, Jr., associate counsel; Stuart P. French, associate counsel; George Bunn, associate counsel; Edwin L. Weisl, Jr., assistant special counsel; Dr. William V. Houston, consultant; Dr. Homer J. Stewart, consultant; and Dr. Edward C. Welsh, staff adviser.

Senator JOHNSON. The committee will come to order.

The committee plans to hear today Gen. James Doolittle, Dr. John Hagen in the morning session, and Director of CIA Allen Dulles, in the afternoon session. We do not plan an evening session.

On Wednesday, beginning at 10 o'clock, we will hear the Secretary of Defense, Mr. McElroy; the Under Secretary of Defense, Mr. Quarles; and then Mr. Holaday.

We do not plan an evening session tomorrow evening, if we can conclude with those witnesses. If we have not completed with their testimony, we will have an evening session.

The committee will then take a recess until December 13.

In the meantime, the staff will make preparations for our witnesses to be heard in open session on the 13th, 14th, 16th, and 17th. If we are able to conclude with the witnesses that are ready to testify at this time, we will conclude the hearings on the 17th until after the Christmas holidays.

If we have not finished with hearing the witnesses ready to testify, we will continue on the 18th, possibly the 19th.

Immediately after the first of the year, we will continue with further hearings. I want to make it abundantly clear there has been no time limit set on the hearings. The authority of the committee does expire at the end of January, but we plan to proceed as expeditiously as we can, cover as much ground as is possible. This is not a situation that permits us to dawdle around and take things in our stride. We are going to be expeditious, but we are going to try to be thorough,

and there have been no limitations set on the number of witnesses or the number of days we will have open hearings.

We will hear as much as possible in open session. If a security question arises, we will go into closed session.

Our first witness this morning is a man who bridges three careers, scientific, industrial, and military. In all three, he has served with high distinction.

Gen. James Doolittle needs no introduction, either to this committee or to the American people. I shall recount his biography only for the sake of making the record of this hearing complete.

General Doolittle is a native of California. He received his bachelor of arts degree from the University of California in 1918, his master of science degree from Massachusetts Institute of Technology in 1924, and his doctor of science degree from the same institution in 1925.

He was an aviator in the United States Army from 1917 to 1930, when he resigned to accept a position with the Shell Oil Co. He was with that corporation until 1940, when he returned to active duty with the Army Air Corps.

During the Second World War he commanded the 12th Air Force in north Africa, the 15th and 8th Air Forces.

He commanded the latter on Okinawa when the war ended in 1945. He returned to inactive duty and his employment with Shell Oil Co. in 1946.

General Doolittle, there are many reasons for calling you before this committee today. You have a distinguished scientific background. You have practical production experience. You hold the highest military award that the country grants to any man, but there is another reason which, to me, is extremely important.

In 1942, our power in the Pacific was gone. Battleships, shore installations, and forts were merely ruins of twisted steel and shattered concrete. We were powerless to halt the advance of an enemy, and American humiliation was quite complete.

Suddenly came the news of the bold, audacious raid over Tokyo. In our darkest hour up to that time, you led Americans to the attack, the attack right at the heart of the enemy. The news electrified the country.

Our people became buoyant and confident and ready to take on any task, no matter how big or how dangerous. The difficult became something to do immediately. The impossible became something that might take a little time.

Once again we Americans are faced with tasks that are difficult, and that seem impossible. We have called upon you today for your views on how the difficult can really be done, and how the impossible can be done in a little time.

General Doolittle, it is a very great pleasure to have you with us today, and now, will you stand and raise your right hand, please?

We have a custom of swearing each witness. Do you solemnly swear that you will give this committee the whole truth and nothing but the truth?

General DOOLITTLE. I do.

Senator JOHNSON. Mr. Weisl, will you proceed?

**TESTIMONY OF JAMES H. DOOLITTLE, CHAIRMAN, SCIENTIFIC
ADVISORY BOARD**

Mr. WEISL. General Doolittle, as our chairman, Senator Johnson stated, you are in a unique position to help this committee and to properly inform the American people. About one-half of your career has been spent in the military field, and the other half has been spent in a business and civilian career.

May I ask you, General, whether you serve on any committees connected with the defense and the preparedness of the United States?

General DOOLITTLE. Yes, Mr. Weisl; I serve on several governmental committees, and am chairman of three.

Mr. WEISL. What committees are you chairman of, General?

General DOOLITTLE. I am Chairman of the Air Force Scientific Advisory Board, Chairman of the National Advisory Committee for Aeronautics, and Chairman of Governor Stassen's Air Inspection Panel.

Mr. WEISL. Have you been appointed on some of these committees by the President of the United States?

General DOOLITTLE. Most of them, sir, are Presidential appointments.

**RUSSIA'S RATE OF PROGRESS AND GROWTH SURPASSES THE UNITED
STATES**

Mr. WEISL. Are you familiar with the testimony which was given yesterday by Dr. Teller and Dr. Bush?

General DOOLITTLE. I read some of it in the papers. I had breakfast with Dr. Teller this morning, and he discussed his testimony.

Mr. WEISL. Do you agree, generally, with Dr. Teller?

General DOOLITTLE. I do.

Mr. WEISL. Do you agree that we are behind Russia in military preparation?

General DOOLITTLE. Yes.

Mr. WEISL. Do you agree with Dr. Teller that the Soviet Union is either ahead of us or about to catch up to us and surpass us in science and technology?

General DOOLITTLE. I believe that the rate of Russian progress is much more rapid than ours; that, in some areas, she has already passed us. If the rate continues, she will pass us in all.

Mr. WEISL. Do you wish to make any further comments on those subjects?

General DOOLITTLE. I might speak a little about why the Soviets are ahead of us in some aspects of missiles. I say "some" aspects because I am not sure she is ahead in all.

There are, as you know, four types of missiles—surface-to-surface, surface-to-air, air-to-surface, and air-to-air.

In the air-to-air missile, there is considerable question as to whether she is ahead of us, whether she has a missile to shoot from one air-plane at another as good as our Falcon or as good as our nuclear-warheaded air-to-air missile.

However, in the field of long-range missiles, surface-to-surface missiles, IRBM's and ICBM's, she is certainly ahead of us.

I think there are several reasons for that. One reason, and, perhaps, the primary reason, is that she started sooner. She started in 1946, and we did not start a coordinated effort until 1953, 7 years later. She has been at it 11 years; and we, 4.

I think a second reason is that she is working harder than we are; even in her schools she works harder. They have a system known as the double-incentive system. I do not advocate it. Here we have a single-incentive system. In Russia, you are rewarded for excellence, and you are destroyed if you do not do a good job.

I believe the third reason she is ahead is because she is sacrificing more than we are. She has a true arms economy. We have, I am afraid, something of a butter economy.

Economists estimate that about one-fourth of Russia's gross national product goes into her military. In our case it is about $8\frac{1}{2}$ percent, or roughly one-third as much relatively.

I may appear to wander afield a little next, but I would like to point out some of Russia's advantages.

One is that she has a definite, clear-cut objective. This objective is world communization and world domination. She has a long-range, flexible, consistent plan for the achievement of that objective.

The series of 5-year programs that she has carried out to implement the plan have been programs of militarization, industrialization, and education. I am sure that the military people have or will tell you about her military program.

The members of the various industries keep closely in touch with her industrial program, and while figures are difficult to confirm, economists and geopoliticians estimate that her industrial base in 1947, just 10 years ago, was one-seventh of ours, that now it is about one-third of ours, and that it is increasing twice as fast.

Her gross national product is about one-third of ours, and is increasing half again as fast.

MUST OVERHAUL OUR EDUCATIONAL SYSTEM TO CATCH UP WITH RUSSIA

Only lately have we come to realize that the primary foundation upon which their new technology is built is their excellent educational system.

Their excellent educational system and their appreciation of the value of science are largely responsible for their rate of technological progress, and for the fact that in some areas they are ahead of us.

In order for us to catch up, I am satisfied that we must overhaul our own educational system.

There are definite educational needs. We need more classrooms, particularly in the secondary schools. We need more science teachers. We need better science teachers. Certainly some of our science teachers are dedicated people, but many of them are not versed in science, not able to teach it properly, and certainly not able to make it live so it is an interesting subject and elicits the interest of the young high school people.

Certainly the scientist and the educator must be given more prestige, and I touch on a delicate subject, more pay.

A Russian scientist professor gets roughly 50 times as much as a day laborer. Here in many cases they do not get as much.

Certainly we must give more kudos, more encouragement, more praise, more honor, if you will, to the science students.

To catch up with Russia, the American people have to be alerted to the threat. The one good thing that sputnik did was to start that awareness.

The basis of the threat is the Soviet excellence in science and technology. Certainly they are ahead of us in some areas; as I said earlier, they are catching up in others, and the real threat is their rate of progress. Their rate of progress is much more rapid than our own.

The thought is sobering, but in no sense hopeless, but there is no room for complacency. We must develop a sense of urgency. We must be willing to work harder and sacrifice more. We must increase the goods produced per man-hour, probably work longer hours.

We would like to balance the budget, cut military expenses, reduce taxes. Russia won't let us.

URGENCY IN MEETING DEFENSE REQUIREMENTS—INCREASED SPENDING

Mr. WEISL. General, you have told us about the more or less long-range program that we must engage in in order to keep up and surpass, if possible, Russia's rate of growth and achievement. Can you tell us something about the immediate problem that faces us?

General DOOLITTLE. Yes, sir.

It is difficult to separate our immediate problem and our long-range problem and the programs that we must have to implement them.

I would certainly start by saying that we must maintain a strong, modern military defense establishment, because the only thing that Russia respects is strength.

In order to say what we have to have in that Military Establishment, I must first disqualify myself as far as the Army is concerned. I am not knowledgeable on their requirements, and I merely say that they should have what they need to do their job.

I know a little more about the Navy, and obviously submarines, antisubmarines, and submarine missiles, are a part of the Navy's program, and they should have what they require in order to carry out those programs.

On the Air Force requirements, I am somewhat more knowledgeable, because I have been 40 years in aviation, having started in 1917 and been associated with it continually ever since.

Certainly the primary requirement, as far as the Air Force is concerned, is a strong Strategic Air Command. This is our basic deterrent, and it is the agency that would be obliged to win a war if we cannot deter a war.

They must have sufficient aircraft; and now the number they have, I should say is skimpy.

Mr. WEISL. Is what?

General DOOLITTLE. Skimpy.

They must have missiles as fast as they are developed and can be fed into the inventory. They must have adequate crews, both air and ground, to fly the aircraft and to maintain them.

They must have sufficient airfields in order to permit the maximum efficient dispersal. There must be some base hardening of those airfields so that a sneak attack could not put them all out of commission.

They must be on maximum alert, and must have the facilities required to permit maximum alert.

The Air Force is now striving toward having one-third of their force on alert at all times. They have not yet achieved this, and it should be achieved with all possible expedition.

They must have enough money for gas, oil, spares, the so-called O. and M. funds, in order that they can obtain and retain a sufficient amount of training.

My own personal experience is, I flew for 30 years. During that time I averaged roughly an hour a day. As I got tied down to a desk and found it impossible to fly as much as I should like, I quit when I couldn't get 20 hours a month.

In some categories, our Air Force is getting 5 hours a month to fly in. This is far too little to maintain the proficiency required. We must be more generous in this particular aspect, which fortunately is not a particularly costly one.

I would like at this point to point up the complexity of the modern airplane. I think the simplest way to point it up, and speaking in round figures and not endeavoring to be precise, because every airplane costs a little more or a little less, according to the number you make, and so forth, but just order of magnitude on complexity.

In World War I, a fighter plane cost about \$5,000. In World War II, about \$50,000. In the Korean war, around \$500,000.

The new long-range Mach-3 interceptor presently being considered will cost several million, say 5 million.

So you have in this period of time gone from a weapon that cost a unit of 1, to a unit of 1,000 times that much.

I think that points up more forcibly than anything that I can say the increased cost of the Military Establishment, and that complexity goes into the maintenance and operation, as well, so it points up the increased importance of continuing to have our crews always trained and alert. So much for SAC.

Mr. WEISL. General, may I interrupt?

General DOOLITTLE. Yes, sir.

Mr. WEISL. Before we leave SAC, you have told us what the Strategic Air Command needs to reach its maximum and necessary—

General DOOLITTLE. No, sir.

Mr. WEISL (continuing). Efficiency.

General DOOLITTLE. No; not to reach its maximum. There is no way we could afford to have it reach its maximum. But to reach its optimum.

Mr. WEISL. But to reach its optimum.

Could you tell us what they have at the present time, without violating security?

General DOOLITTLE. Would you mind, Mr. Chairman, if I deferred that to the military people, who are far more knowledgeable on that particular question? I will merely say, in my mind, they do not have enough.

Senator JOHNSON. Very well.

Mr. WEISL. Can you give the committee any suggestions or any advice as to how they can be helpful in seeing that they do get enough?

General DOOLITTLE. Well, this committee is doing, in my mind, the most important job right now that can be done, and that is, assisting in the alerting of the American public to the threat that we face, and I am quite sure that an alerted American public will react properly

and will support the legislation and the administration in the things that they have to have and they have to do.

Mr. WEISL. General Doolittle, you agree, do you not, that we may not have the time that we had in the First and Second World Wars to get ready?

General DOOLITTLE. Well, certainly the big change that has taken place in the military is a change in the effectiveness of our weapons systems. In all past history, there has never been a revolutionary change in weapons. Every advance in weapons has caused a change in our system. Today, we have a revolutionary weapon in the thermonuclear bomb which changes our entire concept, and our ability to concentrate firepower in time and space means a great many things. We are not going to have time. Our decision—I was coming to some of these later.

Mr. WEISL. Very well.

General DOOLITTLE. But your decisionmaking must be very quick indeed. We do not have time to vacillate and will not have time in the future. I was going to come next to the air-defense part of the Air Force's mission.

Certainly we must have improved radar, improved capability of detecting aircraft at low altitudes, improved radar at high altitudes, extensions of the seaward arms, a rapid development and installation of the SAGE system, which is presently lagging. Our air defenses are dependent on it.

Certainly there must be some improvement in and augmentation of our fighter aircraft, immediate improvement and augmentation of our missiles, and we should start at once on an anti-ICBM program, both the passive phase, that is, the detection phase, and the active phase, that is, the destruction phase. We have been going at this slowly, considering it. The time has come now when we must go full out. Above all things, we have to go at a higher rate. We have to speed up.

In TAC, certainly the Air Force should furnish what the Army requires in fighters and reconnaissance, and in transports. In my mind, a certain element of the Army should be mobile. It should be able to go any place in the world in a matter of hours. It should be able to take its organic equipment with it, and it should be suppliable by air over an indefinite period. All of this adds up to an immediate substantial increase in our military budget.

Mr. WEISL. General Doolittle, you have spoken about the number of hours that an airman has in the air. What are the proper number of hours that an airman ought to have the air to be ready and prepared?

General DOOLITTLE. I wanted to be able to fly any type of airplane, any time, any place, and I considered that when I did not get 20 hours a month, I was no longer able to fly in that way safely.

Mr. WEISL. How much more than 20 hours would you say is needed? I don't expect you to be precise, of course, but I think the committee would like to get some idea.

General DOOLITTLE. I do not think that question can be answered precisely, because it depends upon the job that has to be done. It depends upon the individual. But I certainly feel that enough money should be provided so that those people in charge are able to operate a training program adequate to keep our military organization at maximum effectiveness.

Mr. WEISL. Would you say that at the present time they are not getting enough help to do this

General DOOLITTLE. I said that—the Air Force is obliged within its budget to do those things that they consider most important. As a result of that, some of the things that should be done are not done strictly due to budgetary limitations.

My answer to your question is that the Air Force needs more money. I am not qualified to say what the Navy and the Army need because I am not knowledgeable in those areas.

Mr. WEISL. Have you any suggestions to this committee—

AGGRESSIVE RESEARCH AND DEVELOPMENT PROGRAM NEEDED

General DOOLITTLE. I did not finish my answer to your last question, sir.

Mr. WEISL. I am sorry, sir.

General DOOLITTLE. I got off, when I said what should we do now, I got off on what I considered was the important things to do as far as our Military Establishment is concerned.

I feel also that we must have an aggressive research and development program. We must specialize in basic research, in the acquisition of fundamental knowledge. We must learn more about our planet, we must learn about meteorology, oceanography, geology; we must also learn about outer space.

Here again we require a sound educational program to supply the future scientists and technologists necessary to carry out that program.

I think there should be some relaxation of our present security regulations in order to permit the greater dissemination of information. In the past we have considered that we must not let Russia get any of the secrets that we had. We have since found out that she already has many of those secrets, and that we were penalizing ourselves and our allies by not making more of our scientific information generally available. Because a group of scientists, through discussion and through cross-fertilization of ideas can greatly speed up the rate at which they develop new concepts, and this is extremely important. I feel that we must give more information to the public, more information to our allies. The old rule in general was that we should give out no information that would be of comfort or value to the Russians.

I think the new rule should be that every bit of scientific technical information should be disseminated to our public and to our allies where the dissemination of that information does not do Russia more good than it does us. This will permit a very considerable opening up of our security regulations.

Fifth, I think that it is simply imperative that we maintain a sound economy, that is, we must consider economy in our Military Establishment as well as effectiveness, because this cold war may last a long time.

It is going to last, I am sure, until people change. It may last 1, 5, 10, 50, or 100 years. We have got to be prepared to go along that long.

And last, and not least important, I feel that we must develop and maintain a high degree of morality. That was in answer to your question, what should we do now and in the future.

Mr. WEISL. Well, you have emphasized, as have the other witnesses, that one of the primary needs is to provide enough funds and enough staff to do intensive basic and applied research.

In that connection, I have had several talks with Senator Russell, Senator Johnson, Senator Bridges, and others, and they have told me that any request for basic or applied research that has been made to the Senate has been granted, and in many respects increased.

Do you know of any area—

General DOOLITTLE. At the beginning of this meeting, sir, I advised that I was Chairman of the National Advisory Committee for Aeronautics, a research organization that is charged with the acquisition and coordination of information necessary to keep us ahead in aviation.

Mr. WEISL. Yes, sir.

General DOOLITTLE. I am very grateful to learn that we will get the funds that we need to do our job. [Laughter.]

Mr. WEISL. Sometimes, General Doolittle, when the funds are appropriated, they may not be used.

General DOOLITTLE. That is correct.

Mr. WEISL. And some of the complaints that have been made to my staff and myself in that connection are these: the money is appropriated, then it is stretched out, the research is started and then stopped and then started and then changed and then restarted again.

Have you any comment on that sort of a program in dealing with research?

General DOOLITTLE. I might comment on that by saying that I believe that we people of America have two instinctive traits.

One of them is impatience. Impatience is both good and bad; impatience sometimes makes us dissatisfied with the status quo and is responsible for much of our progress. It certainly is bad when we are dealing with the Asiatic who has infinite patience. We become impatient and he outwaits us.

Another American trait is an unwillingness to accept the unpleasant until we are hurt. When we are hurt enough we react soundly, but frequently, we fail to take preventative action and have to take remedial action.

In the case of air traffic, the aviation fraternity knew that the air traffic was becoming overloaded, that accidents were bound to happen.

Even the press took the question up and the public was acquainted with the great number of near collisions, and still nothing was done about it until we had an accident over the Grand Canyon in which a TWA and United plane crashed with all aboard lost.

Then we began to take immediate action.

I believe that this inherent American trait is responsible for many of our problems. We incline to operate like a pendulum. We are over on one side, very enthusiastic. We are over on the other side, very dejected. We seldom stop right in the middle. This has been reflected in our national policies. It has been reflected in our budget. If you observe the Russian budget, it has gone steadily upward since 1945 at the end of the war.

Our budget went down to almost nothing, went up again to a peak in Korea, came down, went up. Our budget goes up whenever Russia frowns and it goes down whenever she smiles, and this puts us at a distinct disadvantage because you cannot turn off a technical project, a research project, a development project, a production project

like you turn off a faucet and then turn the faucet back on when you want to.

You lose people, you lose time, you lose money.

Mr. WEISL. Have you any suggestions as to what this committee or the Senate or the Congress can do to see that we do not indulge in this turning on and turning off process?

General DOOLITTLE. I believe that the hearings that you are having will be very helpful in pointing out some of the faults in our present system.

WAYS AND MEANS OF IMPROVING MILITARY METHODS AND ADMINISTRATION

Mr. WEISL. General Doolittle, you had considerable experience in the Military Establishment, its ways of getting things done, the various duties that the Joint Chiefs of Staff have, the duties and powers that the Secretary of Defense has.

Can you tell this committee anything that might help them in seeking ways and means to improve the methods and the administration of the Military Establishment?

General DOOLITTLE. This is a very difficult question indeed, and I am neither prepared nor competent to answer it in full.

I would like to point out that it is easier to see faults than to see the proper remedial action that should be taken to correct those faults.

There are certain things that have happened that have made our Military Establishment, which I consider as good, not perfect.

The first of those I briefly spoke of, and that is a truly revolutionary weapon has been added.

Nuclear weapons have increased the ability, our ability to concentrate firepower in time and space in the order of a millionfold. This has been followed by entirely new concepts for the use of weapons systems.

I do not believe that the present system is properly designed to employ with maximum effectiveness and minimum cost some of our new weapons and concepts.

I believe that some changes are required. Some can be made without legislation, some will require legislation.

I believe that the changes must be evolutionary, not revolutionary. Certainly at this time, we must not upset our Military Establishment and even momentarily assume a position of weakness.

There is much that is good in our present system.

As a matter of fact, most of the things are good. They should certainly be saved, and in correcting faults we must be sure that we do not introduce new and more difficult problems.

We must be very careful that the cure is not worse than the disease.

Certainly we should eliminate wasteful duplication. I do not believe that all duplication is wasteful. But we must eliminate wasteful duplication.

We must eliminate destructive competition, and again I do not believe that all competition is destructive—all competition is destructive, there is competition that is good.

I do not know—it may be that we are headed toward a single service in one uniform. I do not advocate it at this time, because I have not had an opportunity to study the entire matter through to conclusion.

I do know that the operating commands must not be interfered with by the three individual services in any way that makes it more difficult for them to do their jobs.

I do know that a joint task force should be truly a joint task force with loyalties to getting the job done and not loyalties to individual services.

I do know that decisions must be rapid. Rapid decisions will save money, will save time, and it is quite possible in the light of today's highly destructive weapons that some day a rapid proper decision may be the difference between survival and our not surviving.

It would seem to me, therefore, that this decision making must be thought of at this time.

A first step, it would seem to me, would be to strengthen the office of the Secretary of Defense. It seems to me that he should be provided with an advisory military staff to assist him in resolving the honest differences of opinion that now occur between dedicated military people.

It is very difficult for a civilian who has recently come in from civil life to cross a dedicated military man who has devoted his entire life to the work in which he is engaged.

I therefore feel that a staff of military advisers in the Office of the Secretary of Defense is called for now, and is a natural first step in whatever changes need to be made in our Military Establishment.

I would like to suggest that before any change is made in our Military Establishment that the matter be studied very carefully with an extremely competent board of people, knowledgeable in the legal aspects, the administrative aspects and the military aspects of our Defense Department.

Mr. WEISL. General Doolittle, I think that your suggestion of an operating staff to advise the Secretary of Defense ought to be clarified. He now has a military staff, does he not?

In what respect would your plan of a general military staff for the Secretary differ from the Joint Chiefs of Staff, for instance?

General DOOLITTLE. I believe that the Joint Chiefs of Staff concept is sound but at present it has one handicap, and that is that the Joint Chiefs of Staff represent both the overall military program, and their obligation as head of their service.

Frequently, the Joint Chiefs of Staff do not come to a unanimous conclusion. I do not believe that in this time of crisis, that we can tolerate delays in arriving at the best possible solution of our military problem.

Mr. WEISL. Would not the military—and I am asking this for clarification only, General—would not the military staff of advisers that you suggest be drawn from the different services and would not they each come with a prejudice, so to speak, for want of a better word, in favor of their particular service?

General DOOLITTLE. They should be drawn from young progressive people who have had insofar as possible, experience in all three services. They would have the advantage over the Chiefs of Staff that they are not, none of them would be head of any one service.

Mr. WEISL. Would these men make service on this general advisory staff their career, or would they serve for a time and then return to their particular service?

General DOOLITTLE. They would certainly serve initially for a period of time and then go back to their individual services, where their service on the staff would be remembered. [Laughter.]

Mr. WEISL. But, General—if they were on this advisory staff, advising the Secretary of Defense, knowing that when they gave this advice they would have to go back to their particular service and if they gave advice, to put it bluntly, that their particular service did not like, would not they be in a position to be rewarded or penalized?

General DOOLITTLE. That would be a determinant. It would be a handicap, but in my mind not an insuperable one.

Mr. WEISL. How would we overcome that to make sure that this general staff was a career staff, and would have the interest of the military as a whole in mind, rather than the interest of a particular service?

General DOOLITTLE. Some day, I believe that we will have to have an old type general staff, with a head. This at the present time may not be ready, we may not yet be ready for that, because there is a great fear, which I consider unwarranted, of a military hierarchy.

But some day, we are going to have to have the means of coordinating our planning, and our operations and doing it on a more rapid basis than we are able to do it today.

Then you would have just what you speak of.

Mr. WEISL. Why could not we have an advisory staff of young, vigorous knowledgeable men who would make a career of permanently being an advisory staff to the Secretary, so that they would have nothing in the back of their minds concerning the rewards or punishments that they might receive after they return?

Why should they have to return to their particular service?

General DOOLITTLE. I believe that is a very desirable thing. I question whether it can be sold at the present time.

Mr. WEISL. Why not?

General DOOLITTLE. Because there is on the part of people and the American public, a fear of a military group who will lead us into war. The reason that I know this fear is unwarranted, is because one of my chores was to send young boys out to die, and I do not believe any senior commander who has ever sent young men out to die, wants war.

I don't believe that any professional group hates war as much as the military.

Mr. WEISL. General, since this would be an advisory group, that would be at the beck and call of the Secretary so that when the Secretary has to decide a military matter or a procurement matter, relating to military, he would have the best professional advice. Why would the public consider this power in the hands of a military group?

General DOOLITTLE. I believe this is an evolutionary program that will take a little doing.

Mr. WEISL. Don't we sometimes underestimate the intelligence and the perception of the public?

General DOOLITTLE. Yes. I have great confidence in the concept that a properly advised public will react soundly, and that is something that this group is doing in a very valuable way.

Mr. WEISL. General, have you any other suggestions that you can give to this committee concerning this problem—this general problem that we are investigating?

General DOOLITTLE. Only one last thought, Mr. Weisl. I am convinced that an America alerted to the urgency of our present situation,

can best Russia philosophically, technologically, industrially, and militarily.

I am equally convinced that it will require harder work on our part, and some sacrifice.

It is considered that the Soviet shortage of consumer goods may be a long-term weakness and that the Soviet people may become dissatisfied. I do not think that we can depend on this. It would be fallacious thinking, wishful thinking for us to depend on it.

However, I am quite sure that the long-term conflict between the Soviets and ourselves will be determined by their willingness to get along with less, as they are doing now, as opposed to our willingness to make more sacrifices than we are making at the present time.

Mr. WEISL. General, you have very eloquently pointed out that this committee can serve a great benefit by advising and alerting the people of the United States to the danger that they face, but in the course of my investigation I find that all of us, including the committee, need more information from the military and the civilians and from the committees that are engaged in this war effort.

And you would agree, would you not, that this is the time for every man with information and knowledge to lay the facts on the table clearly and succinctly without holding anything back so that this committee can be properly informed and take proper action?

General DOOLITTLE. That is correct.

Mr. WEISL. I have no further questions, Mr. Chairman.

MISSILE PROGRAM NEEDS MORE FUNDS, RESEARCH, AND COORDINATION

Senator JOHNSON. Thank you, Mr. Counsel.

General Doolittle, by way of a brief summary, if you were given the full responsibility and the complete and absolute authority over our missile program, what would you do to insure carrying out the recommendations that you have made to this committee?

General DOOLITTLE. Mr. Chairman, I believe that the Air Force missile program under the present Western Development Division, or the recent Western Development Division, has gone ahead very well indeed.

Possibly some additional funds would permit some increase in the rate of readiness and the rate of production of the IRBM, the intermediate range missile.

Senator JOHNSON. Would you consider that highly desirable?

General DOOLITTLE. I consider that highly desirable.

As far as the ICBM is concerned, I believe the program is excellent, that it is adequately financed but we must be very alert should they come in to new problems and new difficulties that we make whatever is necessary available to them in order that that program can go forward with all possible expedition.

Senator JOHNSON. Well, now, if you were given full authority and full responsibility over our missile program in order to carry out the recommendations you make, is the only thing you would suggest more funds?

General DOOLITTLE. Certainly, there is some coordination of the overall long-range missile program required.

As I said, the Air Force program did not get into full gear until that coordination took place within the Air Force on their own program.

Certainly, a national coordinating agency would avoid unnecessary wasteful duplication. And I feel that at the present time we must watch out for two things: One is the fastest possible progress, and two, is the lowest possible cost.

Senator JOHNSON. General, to what extent, in your opinion, has our missile program suffered because of deficiencies in our research and development program?

General DOOLITTLE. It is very difficult to give a quantitative answer, Mr. Chairman, but certainly the rate at which we can progress is a function of our accumulated information, and that information sometimes takes a long time to acquire.

I would like to answer that question by saying that we must do more basic research, and that changes in our overall military program, restrictions in budget should not interfere with our accumulation of basic knowledge.

Rather, I should say, if there is a budget reduction we should do more basic research in order to be able to move more rapidly when the obstruction is removed.

Senator JOHNSON. General Doolittle, do you believe that a project like the Manhattan project would be desirable in connection with the missile program?

General DOOLITTLE. I would rather say, Mr. Chairman, that I believe more coordination of the effort is required.

Senator JOHNSON. General, what, in your judgment, should we do to strengthen America's military research and development program?

General DOOLITTLE. Short term, putting more money into our research and development effort would give the effort an immediate stimulus. But long term, we have to consider the educational program, and we have to consider the prestige of the scientists and the science student.

Senator JOHNSON. So, summarizing, General, you would accelerate the program by providing more funds, and you would attempt to effectuate a better coordination?

General DOOLITTLE. That is correct.

Senator JOHNSON. General, I received in the mail this morning a note from a very distinguished scientist, in which he sent me a little verse that he said he had not composed himself, but which he wanted brought to the attention of the committee. In the light of your testimony of the necessity for more funds I am sure you don't share this fellow's view but I would like to have your opinion of it if you will indulge me a moment. [Reading:]

I'd rather be bombed than be bankrupt,
I'd rather be dead than be broke.
'Tis better by far to remain as we are,
And I'm a solvent if moribund bloke.

General DOOLITTLE. I am afraid I cannot endorse that, sir.

Senator JOHNSON. Thank you, General.

General DOOLITTLE. Thank you very much.

Senator JOHNSON. Senator Bridges?

FOREIGN INTELLIGENCE: COLLECTION, INTERPRETATION, AND USE

Senator BRIDGES. General, I have listened with interest to your testimony and I want to ask you a few questions.

Do you believe that Central Intelligence and various intelligence services have consistently, over a period of years, underestimated the Russian strength?

General DOOLITTLE. No, sir. I believe that frequently those who have interpreted that intelligence have underestimated the Russian strength. The acquisition of intelligence is one thing; the interpretation of intelligence is another, and the use of that intelligence is a third.

Senator BRIDGES. You spoke of the period between 1946 and 1953 during which there was virtually no work done in the general missile program.

During that period, were our intelligence services feeding the proper intelligence information into our Government?

General DOOLITTLE. Mr. Bridges, we have never gotten as many hard facts as we would like to have, out of Russia.

During the period shortly after the war, our intelligence system was poor. Since that time it has consistently improved. Now it is much better.

Senator BRIDGES. Well, you are not in a position then to testify whether or not we got the information between 1946 and 1953 and did not act, or whether we got it and ignored it?

General DOOLITTLE. I would like to point out, Mr. Bridges, that I was on the President's Committee which made a study of the covert side of our Central Intelligence Agency.

I am now on the President's Committee on Foreign Intelligence. I would much prefer, if we are going to deal with intelligence matters, to deal with them in closed session.

Senator BRIDGES. I agree, if you have to go into details.

I was just talking about the general philosophy.

General DOOLITTLE. My embarrassment is that I know some things I cannot say and if I did not know them I could say them.

[Laughter.]

Senator BRIDGES. I understand.

COMPARISON OF UNITED STATES AND RUSSIAN EDUCATIONAL SYSTEMS

I will go back a moment to your statement in which you discussed the Russian educational system and indicated what improvements we need. You stated that we need more and better teachers, greater pay, and more classrooms.

Now that is quite a large order. But haven't you omitted one thing in there, which is in giving the young men and women, the boys and girls of today, too much freedom in the selection of courses which they are taught?

Now, this I believe very firmly and I would like to have an authority like yourself comment on it. I don't think the answer is wholly in more teachers and greater pay and more classrooms. I think the students in the secondary school and in college too, are allowed too much freedom of elective subjects and it is only human nature to pick out the easiest ones.

Now, I have three boys, who went through school and college, and were in the military service, and I found out that their tendency was to elect the easiest subjects. I think you must have a stiffening of the curriculum of schools so that some of the harder subjects that will

be more useful to the students and the country will be required. I think that is one of the great weaknesses in the American system and I wonder if you would comment on that.

General DOOLITTLE. Yes, sir. You may remember that I said we had to work harder and that hard work had to start in school. That was part of my thesis.

At the risk of boring you with some statistics, I would like to say that we take 12 years to go through high school here, 8 years in grammar school, 4 years in high school. In Russia they take 10 years. Here we work 5 days a week. In Russia they work 6 days a week in school. Here we work roughly 5 hours a day partly due to the shortage of classrooms. There, including their homework, they work 12 hours a day. At the end of the college term here 14 percent of our students will have had algebra, geometry, and trigonometry. At the end of their high-school course, 100 percent of their students will have had algebra, geometry, and trigonometry plus the calculus which we don't get until we go to college.

In connection with the sciences, 25 percent of our high-school graduates have 1 year of physics; 100 percent of their high-school graduates have 5 years of physics; 33½ percent of our high-school graduates have 1 year of chemistry; 100 percent of their graduates have 4 years of chemistry.

We are making our high-school course too easy. We are making it so easy that even the stupid boys can get through. That is seriously penalizing the bright boys and seriously penalizing us in the acquisition of the type of people that we need.

In Russia, if a chap is not apt at science, and mathematics, he is sent to a vocational school where he can learn a vocation.

I certainly feel that the first thing we have to do is work harder in our schools. But before we can work harder, we have to have more room in which to work, and better people to direct the work.

Senator BRIDGES. I agree with that. In substance you have confirmed my statement here that there is too much freedom in the election of courses in both secondary schools and in colleges and certainly human nature, being what it is, you must direct young minds——

General DOOLITTLE. That is right.

Senator BRIDGES (continuing). In certain directions where you have given them the opportunities to do their own work.

General DOOLITTLE. Certainly we should not give youngsters an opportunity to be lazy.

INTERSERVICE COMPETITION: ADVISORY STAFF TO SECRETARY OF DEFENSE

Senator BRIDGES. General, one more question here.

You spoke about the fact that there should be competition but not too much competition, that there should be differences of opinion but not too many differences of opinion, and so on, and then you said that you were approaching the subject of one uniform; however, you were not ready to give us a thought on that yet.

Don't you believe that as of today a certain amount of competition between the three services is a very healthy thing, up to a certain point?

General DOOLITTLE. I believe that competition is a very healthful thing. I believe that competition on a football field is a very health-

ful thing. But the competition should be directed toward the opposing team. I believe that when people on the football team compete each one ought do the best job he can do, that is healthy competition. When each chap competes in order to show up the other one, that is destructive competition.

Senator BRIDGES. And there should be at the head a coordinator, a czar, or director, whatever you may call him, who will be the final authority to determine where that competition ends and to direct the competition or funnel it into one objective.

General DOOLITTLE. The point I make, sir, is that weapons have become so devastating that we do not have time to dillydally over decisions. They must be made promptly and they must be made correctly.

Senator BRIDGES. Well, now, in that connection, you have advocated a type of military policy committee to associate with the Secretary of Defense.

I went through the hearings of the Joint Chiefs of Staff and I thought that one of the duties of the Joint Chiefs of Staff was to have the top technical people militarily make the decisions and certainly to advise the Secretary of Defense.

Wouldn't you, in your suggestion, be setting up just one more group that would be a complication rather than an asset?

General DOOLITTLE. I believe the Joint Chiefs of Staff are doing an excellent job. I believe also that there are areas in which the Joint Chiefs of Staff have not come to an agreement. Those disagreements should be resolved. I have offered one suggestion as a means of resolving them. I am not sure it is the best suggestion. I started by saying, I did not have much competence in this particular area, and it is an extremely complicated one, and will require a very comprehensive study.

Senator BRIDGES. But would you not include it, then, as an advisory group, within the Department of Defense. Would not the Secretary of Defense be faced with the same problem that he faces now with the Joint Chiefs?

Is it any more likely that the advisory group would make the decision than the Joint Chiefs would?

General DOOLITTLE. I believe they would, because every serviceman has some loyalty to his service. The Joint Chiefs, each one, as the head of his service, has a much greater responsibility, and all of the people under him feel that he has let them down if he goes against their desires.

Senator BRIDGES. Certainly there is one thing——

General DOOLITTLE. The loyalty goes two ways.

Senator BRIDGES. If it held true, and if the Council ever developed, then those generals or admirals once having served on the Council could never go back into their respective services again. They would have to be retired, because if they went back into their services and they had taken positions against their respective services, while serving on the Council their careers would be ended. That is rather bluntly stated, but human nature would enter into the fact there; would it not?

General DOOLITTLE. I would not go that strongly, sir, but I would say that it would not help them any. [Laughter.]

Senator BRIDGES. That is all.

Senator JOHNSON. Thank you, Senator Bridges.

We are delighted to have the senior member of the Armed Services Committee present with us this morning—a man whose name is known in every American household. He is not a member of the subcommittee, but he is the ranking member of the full committee. Senator Byrd, would you like to ask some questions?

Senator BYRD. Mr. Chairman, most of the questions I have had in mind have already been asked, and I am here to get information. I am not a member of the subcommittee, but I am deeply interested, and I want to thank General Doolittle for a very excellent presentation he has made.

General DOOLITTLE. Thank you, sir.

Senator JOHNSON. Thank you, Senator Byrd. We are delighted to have you with us, and hope you will stay as long as you can.

DEFINITION AND STATUS OF MILITARY PREPAREDNESS

Senator Saltonstall?

Senator SALTONSTALL. Mr. Chairman, thank you.

General Doolittle, may I ask you to elaborate a little on two general terms that you used, about which I am not quite clear. You state that the present weapons system was not adequate. There could be some improvement without legislation and some with legislation. When you use the words "weapons system" just what do you mean?

General DOOLITTLE. I did not mean to use "weapons system" in that relationship. I meant to say that the Military Establishment—in the Military Establishment there could be some changes, and that would effect a more effective utilization of the various weapons systems.

Senator SALTONSTALL. In other words, it is the Military Establishment that are using the present weapons and improving their present weapons, that you spoke about?

General DOOLITTLE. I misspoke myself if I used the term in that way.

Senator SALTONSTALL. Mr. Weisl asked the question whether we were behind Russia in military preparedness, and you answered that question, if I remember correctly, "Yes." Now, there again, "military preparedness" is a very broad term. Would you be willing to define that a little more clearly?

General DOOLITTLE. Speaking of specific weapons, it is my belief that we are ahead of Russia in the capability of our Strategic Air Force. However, you will remember that, shortly after the war, we had an offensive capability; Russia had none, and she devoted her efforts to building up her air defenses; so, she has been building up her air defenses longer than we have. I believe that she has a stronger air defense than we have.

Senator SALTONSTALL. So, when you use the words "military preparedness," you use them more in terms of our defensive posture rather than in our aggressive posture?

General DOOLITTLE. I did, but shouldn't have. I will have to qualify that by saying that at the present time I believe that we are stronger, militarily, than Russia.

Senator SALTONSTALL. Good.

General DOOLITTLE. At the present time, Russia's rate of progress is more rapid than ours, and, unless we continue to forge ahead at full speed, she will soon overtake us.

NACA—MISSION AND REQUIREMENTS

Senator SALTONSTALL. You stated in your opening answer, in your first answer to questions, that you were the Chairman of the National Advisory Committee on Aeronautics.

General DOOLITTLE. NACA, the National Advisory Committee for Aeronautics.

Senator SALTONSTALL. I, personally, have always felt that Congress did not give that Committee adequate support, financially. Could you define a little bit what that Committee does, its work, because always it seemed to me very important and we did not give it due consideration.

General DOOLITTLE. The National Advisory Committee for Aeronautics was established by the Congress in 1915 to develop American aviation and to keep us abreast of, and preferably ahead of, the rest of the world in aeronautics.

It now has three major laboratories, one, the Langley Laboratory, Hampton, Va.; one, the Lewis Laboratory at Cleveland; and one, the Ames Laboratory at Moffett Field, Calif. It has two subsidiary laboratories, one at Edwards Air Force Base; and a missile-testing laboratory at Wallops Island.

The total manpower is in the order of 8,000; the total budget for new equipment and for operation is in the order of \$100 million a year.

Senator SALTONSTALL. Do you believe that we in Congress are supporting that Committee adequately?

General DOOLITTLE. I have had to appear before the Bureau of the Budget, and then before the Congress, and I would be very grateful if both agencies would be more generous in the future.

Senator SALTONSTALL. The work of that Committee is very important.

General DOOLITTLE. I believe it is imperative that this Committee be properly supported if we are to do the research necessary to improve our position. For a long while we wanted to hold our position. Now we must improve our position.

Senator SALTONSTALL. And there is no duplication, from the Government point of view, in the work that this Committee does?

General DOOLITTLE. No, sir. The Government does what work they can in their own laboratories, and the NACA takes care of the overflow from the Government laboratories. They work very closely together.

On the NACA there are 2 senior members from the Air Force, 2 senior members from the Navy, and, I hope there will soon be 2 senior members from the Army. We are presently soliciting that legislation.

Senator SALTONSTALL. And you believe in the work of the National Science Foundation?

General DOOLITTLE. Yes, sir; work very closely with them.

Senator SALTONSTALL. And you follow that work, too, fairly closely?

General DOOLITTLE. The Director—I am the Chairman, sort of Chairman, of the Board of Directors. The actual Director, Hugh

Dryden, who corresponds to the president of a corporation, works very closely with the Science Foundation. As a matter of fact, they are next door; the offices are next door.

RELATIVE POSITION OF ADVISORY STAFF AND JCS

Senator SALTONSTALL. One other question that I am still not clear on is—and this is a touchy question, judging from the way you answered Senator Bridges, and also counsel—is your idea of the position of the Joint Chiefs of Staff. Now, we listened to Dr. Bush yesterday quite at length. Of course, he has some very strong ideas on that subject.

Do I get from you the feeling that the Joint Chiefs of Staff should still be a planning organization, from the point of view of military operation, and that the Secretary of Defense should have also an advisory group to advise him? Or do the Joint Chiefs of Staff, under your conception, become more of an operating, a joint task force agency?

General DOOLITTLE. I would like to see the time come when there was an operating staff.

Senator SALTONSTALL. A joint task force?

General DOOLITTLE. As well as an advisory staff. I think the first step is an advisory staff, which would later become an operating staff.

Senator SALTONSTALL. I'm still not clear on this point.

General DOOLITTLE. I say the first step in giving the Secretary of Defense a military staff would be an advisory staff to advise him on military matters, so he could resolve the differences of opinion that exist at the Joint Chiefs of Staff level. Someday, I would hope to see a general operating staff, with one man able to make the military decision.

Senator SALTONSTALL. Which would be similar to, we will say, General Eisenhower's position in Europe or General MacArthur's position in the Far East?

General DOOLITTLE. That is correct.

Senator SALTONSTALL. My time is up, General, and I would like to just ask you this question: I like the sixth point that you mentioned, about a high degree of morality, when you said our case was not hopeless and that we were moving ahead, and we would be ahead of Russia, industrially, economically, and 3 or 4 other terms, you forgot morality.

Now, you certainly——

General DOOLITTLE. I said philosophically, and considered morality in that.

Senator SALTONSTALL. I would like to have you come right out and say it.

General DOOLITTLE. All right, sir.

Senator SALTONSTALL. Thank you very much.

Senator JOHNSON. Senator Kefauver?

INADEQUATE COORDINATION OF MISSILE PROGRAMS

Senator KEFAUVER. Thank you, Mr. Chairman.

General Doolittle, you said in a general way that what we needed to get on with our rocket and missile and general defense program was more coordination.

Will you give us examples of where the lack of coordination has deterred our efforts, in the missile program, for instance?

General DOOLITTLE. I believe the quicker a decision is made on the Thor-Jupiter controversy, the quicker we will make progress, and the more money we will save.

Senator KEFAUVER. Were you a member of the committee which decided which service was to go ahead with our satellite or inter-continental missile program?

General DOOLITTLE. No, I was not in on that, sir.

Senator KEFAUVER. Do you feel that lack of coordination has substantially held back our missile and satellite and general weapons program?

General DOOLITTLE. I did not sit in on that committee, Mr. Kefauver, and I am not sure of my facts.

Senator KEFAUVER. Well, then, sir, advocating greater cooperation, what specific steps and measures would you take to bring it about?

General DOOLITTLE. I believe you were out when I——

Senator KEFAUVER. No, sir. I have been here all the time. I heard about the advisory board to the Secretary of Defense.

But right now, what specific measures would you take to insure greater coordination?

General DOOLITTLE. I would answer that question by saying that the Air Force missile program is coordinated within the Air Force, and is going ahead very well indeed. I believe that the overall missile program should be coordinated within the Defense Department.

Senator KEFAUVER. Well, how would you do that?

General DOOLITTLE. You are asking me questions that I have not considered. I did not consider that was my job, so I did not give much thought to it, sir.

Senator KEFAUVER. But considering that we hope missiles and satellites may have some civilian use and application in the years to come, do you think that the missile program should be exclusively coordinated in the Defense Department under the Secretary of Defense?

General DOOLITTLE. I believe that the differences of opinion that exist between the services should be resolved in the Office of the Secretary of Defense.

Senator KEFAUVER. Do you feel they have not been?

General DOOLITTLE. Not all of them; no, sir.

Senator KEFAUVER. Which ones have not been?

General DOOLITTLE. I mentioned one, the Jupiter-Thor program.

Senator KEFAUVER. In saying that you feel the Air Force is in a position to go ahead with the satellite or the ICBM and the intermediate missile, and that they should have more money and backing to do that, have you considered the potentialities of the Army program, the Redstone Arsenal?

General DOOLITTLE. I am not acquainted with the Army program, sir.

Senator KEFAUVER. How can you say the Air Force program is better than the others?

General DOOLITTLE. I didn't. I said the Air Force program got better when they coordinated it within the Air Force.

Senator KEFAUVER. Well, do you know, then, which program is better to push at the present time?

General DOOLITTLE. I am a little deaf, sir.

Senator KEFAUVER. I say, do you know, then, which program is better to get behind at the present time, the Air Force program, the Army program, or which program?

General DOOLITTLE. No, sir, I have no recommendations on that.

Senator KEFAUVER. I thought, sir, you advocated the first thing to be done is to get stronger behind the Air Force program.

General DOOLITTLE. No, sir. I strongly recommended that we get behind the best program, and am not in position to say which one that is.

Senator KEFAUVER. Well, how do you think that that should be determined? Who is in the best position to determine that?

General DOOLITTLE. Certainly it should be determined in the Office of the Secretary of Defense.

Senator KEFAUVER. Do you think it has been determined at the present time?

General DOOLITTLE. My understanding is that a decision will be made around the 1st of January. This is purely hearsay. I have not been told this officially.

Senator KEFAUVER. Well, do you not think a decision should have been made a long time ago?

General DOOLITTLE. Yes, sir.

Senator KEFAUVER. How long ago?

General DOOLITTLE. As soon as it was possible to evaluate the two systems.

Senator KEFAUVER. Well, they had a committee operating a year ago to determine that, did they not, headed up by Mr. Quarles? Did they not have a committee to evaluate the various programs and make the decision?

General DOOLITTLE. There has been considerable study of it, but I do not believe that a decision has ever been reached at high level as to which is best, which is the better of the two, and which should be specialized on.

Senator KEFAUVER. You think that is one of our grave shortcomings, the fact that no decision has been made and it has been delayed?

General DOOLITTLE. I think one of our shortcomings, Mr. Kefauver, is a lack of prompt decisions on important things—

Senator KEFAUVER. Thank you, General.

General DOOLITTLE (continuing). Because of honest differences of opinion on the part of military people.

Senator KEFAUVER. Thank you, Mr. Chairman.

Senator JOHNSON. Senator Flanders?

General DOOLITTLE. I am sorry, Mr. Kefauver, I do not hear very well, and I apparently misunderstood something that was said, and I apparently said something that I did not mean to say.

Senator KEFAUVER. Well, I am sorry I did not speak louder. I do not know what it was that you referred to. [Laughter.]

General DOOLITTLE. Well, I did not mean to say that a decision should be made in favor of the Air Force, and if I said that, I misspoke myself. I think a decision should be made in favor of the best weapon.

Senator KEFAUVER. General, as I got the burden of your testimony, in response to questions by Senator Johnson, he asked you what should be done now, and I understood you to say that we should get

behind the Air Force program with money and backing and go ahead with it. So I interpreted that as meaning that you had information as to the superiority of the Air Force program, and you were advocating that over the Army program.

But I find now that that was not the case; is that correct?

General DOOLITTLE. If I created that impression, I spoke poorly.

Mr. WEISL. You did not create that impression as far as counsel was concerned, General Doolittle.

General DOOLITTLE. Thank you, sir.

Senator JOHNSON. Thank you, Senator Kefauver.

INTERSERVICE TRAINING IN SERVICE ACADEMIES

Senator Flanders?

Senator FLANDERS. General, I have been very much interested in and concerned with the question of cooperation between services, every member of which has been trained in 1 service only, and every member of which has served in 1 service only, and expecting objective cooperation.

I would like to inquire of you whether you think there would be any usefulness in cross-fertilization at the stage of training in the three Academies; would there be any usefulness in having a course in which the Army gave the Navy and the Air Force its concept of its sphere of action, and in which, in turn, the Navy presented its point of view before the Army and the Air Force, and the Air Force before the Army and the Navy, in the process of educating the young officers?

General DOOLITTLE. I believe that would be a valuable thing.

Senator FLANDERS I would like——

General DOOLITTLE. And after that, I think interchange in the services would be a valuable thing.

Senator FLANDERS. Yes. But I would like, Mr. Chairman, to nail that suggestion down as one of the things we might well consider.

COMPOSITION OF ADVISORY GROUP

Now, the next thing is like unto that. If I understood our friend, Van Bush, yesterday, his suggestion was that the advisory group might well be made up of elder statesmen of the services who had years of experience and nothing to lose.

What do you think of that proposal?

General DOOLITTLE. The danger in that proposal is that after people leave the service and become separated from it, they soon lose touch with new developments, and that advisory group must be a group of people who are in touch with new developments and who are still young enough to accept and adapt new concepts.

Senator FLANDERS. You would not want to tag them just before they passed out, while they were still in touch?

General DOOLITTLE. I would like to point up, Mr. Flanders, that tradition is a very valuable thing until it begins to interfere with progress, and we have to be very careful in a committee of that kind not to get traditionists on it. For instance, I remember not so long ago when the cavalry had to give up their horse and saber, and become mechanized. They did it very grudgingly. I remember my own group of aviators when we had to give up our helmet and goggles,

the insignia of our profession, and go from open planes into closed planes, we resented it very much, indeed.

So we have to be sure that this group of elder statesmen are (a) read into everything that is going on, and (b) are still a group of aggressive, progressive people who can accept and utilize new concepts.

Senator FLANDERS. I must say, General, that you are making the task of selecting this advisory group rather difficult.

General DOOLITTLE. I think it should be very carefully selected, sir.

AIRCRAFT VERSUS MISSILES: MISSION AND CAPABILITY OF STRATEGIC AIR COMMAND

Senator FLANDERS. Thank you. Now, I have one other question that I wish to ask you, perhaps not in a single question but briefly. There has been some talk here and there about the future of the Air Force being dubious in view of the potentialities of missiles of all sorts and varieties. I showed a picture of 39 of them yesterday which I thought was too much. But in view of all these available potential and hoped for missiles, the field of the Air Force seems to be, in view of some critics, seems to be shrinking. But I think we have agreed so far, as I have listened to the questioning of this committee, that there is at least an intense, invaluable and irreplaceable interim field for the Air Force, whether it is going to pass out eventually or not.

Now, you realize that when I say "pass out," I am not convinced that it is going to, but I am just talking from that standpoint for the moment. In view of the concentration of the Russians initially on defensive measures, have you any confidence in the Air Force as presently constituted being able to reach a good percentage of targets in Russia?

General DOOLITTLE. Yes, sir. I am convinced that the Air Force as presently constituted will be our basic weapon for the immediate future. I see the missile first supplementing and gradually replacing some of the Air Force missions in both offense and defense. I do not expect to see the airplane out of the air in my lifetime.

Senator FLANDERS. You mean militarily out of the air?

General DOOLITTLE. I mean militarily.

Senator FLANDERS. Yes. Strategically, you don't expect to see it strategically out of the air?

General DOOLITTLE. This is a question that cannot be answered until an IRBM and an ICBM have been proven and then put into production, and we are sure that they will do all of the jobs that the present Air Force SAC airplanes will do. By the same token, I do not believe that missiles will completely replace the fighter plane until we have something in a missile that will accomplish the present difficult problem of identification, which only a man can do so far.

Senator FLANDERS. Yes; there is no IBM machine yet can do that.

General DOOLITTLE. No, sir.

Senator FLANDERS. Now then, I just want to express again my understanding that you feel that in spite of the concentration of the Russians on air defense, that the existing and developing Air Force of this country can reach a good percentage of the targets, in case of necessity, in Russia?

General DOOLITTLE. Yes.

Senator FLANDERS. Thank you. That is all, Mr. Chairman.

General DOOLITTLE. May I qualify that by saying that a very few airplanes could not. We have to be able to attack in strength to get enough through to do the job. There is a fallacious theory that if there are 10 targets that we would like to take out and each target can be taken out with 1 bomb that we need only 10 bombs and 10 airplanes. This is wholly fallacious, because we must overwhelm their defenses in order to get through. We must saturate their defenses.

Senator FLANDERS. That leads, Mr. Chairman, if I may have one more question—I think I am within my time—to looking at the same problem in the reverse. You would expect that if the Russians are sensible, and sometimes we think they are and sometimes we think they are not, if they were to attack, the first thing probably that they would attack would be our bomber bases. Is that not a reasonable—

General DOOLITTLE. That is a reasonable assumption.

Senator FLANDERS. Yes. Do you then feel that further dispersal of our bomber bases is a No. 1 requirement in our airplane program?

General DOOLITTLE. Yes, sir. The Air Force presently has a dispersal program. I believe that dispersal program should be hurried so that we have not more than one squadron of heavy bombers on each base.

Senator FLANDERS. Thank you. That is all, Mr. Chairman.

MISSILE PROGRAM DIRECTOR WITH POWERS OF THE PRESIDENT

Senator JOHNSON. Senator Stennis.

Senator STENNIS. General Doolittle, I think your testimony here has certainly been very valuable for the committee; most of the questions I would have asked you have already been asked and have already been answered.

There is one thing, though, that I want to emphasize. As I understand, you say that we are lagging behind Russia now in the rate of progress?

General DOOLITTLE. Yes, sir.

Senator STENNIS. Of our military program, including the missile program. And that this lag is due more to a lack of emphasis than to lack of capacity or ability. Now, you and the other witnesses have convinced me that to really make this program move as it should, there must be some single responsible official armed with the powers of the President to coordinate, as you say, and keep moving this entire missile program at full speed.

Do you agree to that, that there must be someone armed with the powers of the President?

General DOOLITTLE. Yes, sir.

Senator STENNIS. To supervise and push to the utmost the missile program?

General DOOLITTLE. That is right.

Senator STENNIS. Is that correct?

General DOOLITTLE. That is right.

Senator STENNIS. And, if necessary, that official would have to exercise the powers of the President even beyond the Budget Bureau or even the Department of Defense?

General DOOLITTLE. That is right.

Senator STENNIS. I thank you very much, General Doolittle.

That is all, Mr. Chairman.

Senator JOHNSON. Thank you, Senator Stennis.

PRESIDENTIAL ADVISORY COMMISSION COMPOSED OF SENIOR OFFICERS

Senator CASE?

Senator CASE. Thank you, Mr. Chairman.

General Doolittle, your appearances before congressional committees are certainly stimulating in every instance and this morning has been no exception to that proposition. The discussion that you have given us relative to the problems within the Defense Department, the organizational structure of the Defense Department, the definition of roles and missions, is one that has intrigued me in the past a great deal.

Last August when the Military Construction Subcommittee presented its bill to the Congress, I proposed at that time the creation of a Presidential commission to take the first step. It seems to me as I have listened to you this morning, you have defined 2 steps, 2 problems. One is the study of the structure of the Defense Department, and the second is the possible creation of an overall operating staff.

Now, I was very much interested in Senator Flanders' suggestion or the question he put to you about the utilization of some senior officers. Last August when I said I thought the time would come for the President to appoint a commission to examine the structure of the Defense Department and consider the possible simplification of our present triplication of armed services, I suggested that the early retirement of senior officers in recent years affords an ample reserve of qualified men who could serve on such a Presidential commission.

Now, I call your attention to the fact that what I was suggesting there was a Presidential commission to inquire into the structure of the Defense Department. It was not the overall operating staff. So I want to, with that in mind and with your own statement in mind that any reorganization within the Defense Department should be evolutionary so as not to upset it—I wonder if you would not agree that the senior officers who have been early retired and who are still mentally alert and acquainted with the Defense Department, the Defense Establishment, would not afford a pool from which the President might draw material for a commission to study the structure of the Defense Department?

General DOOLITTLE. I believe that such people should serve on a committee of that type. There must be on that committee some knowledge of the military, and it can only be gotten from military people, ex-military people in this case.

Senator CASE. Members of our subcommittee on military construction last summer, as Senator Stennis will recall—Senator Stennis, Senator Jackson, and myself—had several conferences with representatives of the different services when we were making decisions relative to construction of stations for Nike and Talos and Bomarc and all things related to the point defense system or even the small area defense system; and we were impressed, I am sure, with the fact that we have men of great outstanding ability in the Army and in the Air Force, but there seemed to be a limitation on interservice use of their ability.

I am trying to find some way in which we could make available to the total defense problem the abilities of these men. It seemed to

me that a study by a qualified commission was necessary. I am going to, if I may, send you some of my observations on that at the time, but I think nothing more important could be done by this committee than to make some recommendation with regard to the possible simplification of our triplification, which I think we now have, and the determination of roles. We have seen each service interpret its roles, and as a result, we do have a good deal of rivalry and I think some wasteful competition in talent and in material and in funds.

General DOOLITTLE. Yes, sir.

Senator CASE. I think your testimony on that point has been very helpful this morning.

That is all, Mr. Chairman.

Senator JOHNSON. Thank you, Senator Case.

OVERTIME CEILING IS A FISCAL LIMITATION

Senator Symington?

Senator SYMINGTON. General Doolittle, it is a pleasure to see you here this morning, sir. In my opinion, you and General Spaatz are more responsible for furthering the airpower of this country than any other living men. It is an honor to have you before the committee. Can you hear me?

General DOOLITTLE. Just barely, sir.

Senator SYMINGTON. I will try to get a little closer.

One thing that surprised me a bit. You said that the intercontinental ballistic missile was adequately financed. The question of overtime involves the question of financing, and inasmuch as at least until very recently there have been limitations on overtime on the Air Force ballistic missile program, would you not call a limitation on overtime a lack of adequate financing?

General DOOLITTLE. I am repeating, Mr. Symington, what General Schriever told me last week. I asked him if additional money would expedite his program. He said at the present time no. However, there would be points where he would come up against handicaps and then would need extra money to get along.

Senator SYMINGTON. A limitation of overtime would be a fiscal limitation, would it not?

General DOOLITTLE. Yes.

ADDITIONAL FUNDS NEEDED TO RETAIN MECHANICS AND OPERATE PLANES

Senator SYMINGTON. I have a story here by a responsible reporter, Tom Lambert, in the New York Herald Tribune on November 13:

The Defense Department has lifted restrictions on overtime pay for workers developing the Army's intermediate range ballistic missile, but is keeping a ceiling on overtime for most workers on the Air Force's intermediate range and intercontinental ballistic weapons.

Then the article proceeds to develop that in more detail. Do you know if there has been a change in this program since the 13th of November?

General DOOLITTLE. I do not.

Senator SYMINGTON. I also have some more information on that, and I am glad that you do feel that a limitation on overtime is a fiscal limitation.

Now, you mentioned that you thought that, net, we were ahead of Russia primarily because of the Strategic Air Force; is that correct?

General DOOLITTLE. I believe that our Strategic Air Force is ahead of Russia's strategic air force, and that is primarily because of the excellence of the equipment and the superb training of the pilots and crews. It can be made still better if we get a little more money for it.

Senator SYMINGTON. If the Strategic Air Force or much of it over a period of weeks had been grounded because it did not have enough money for fuel, that would affect your opinion in that regard, would it not?

General DOOLITTLE. This to me would be a critical shortage, one not to be tolerated.

Senator SYMINGTON. Now, about the training of the crews, I am glad you brought that up. In the airpower hearings last year, it was pointed out by General LeMay and General Wade how SAC crews suffer because of lack of money, lack of maintenance and operation funds and lack of training funds. One illustration of that was when General Wade said that at the end of the fourth year of his first enlistment the man in SAC is ready for upgrading to the skilled level, to the supervisory technical level. It is at this point that 90 percent of these people leave the service and return home. At this point in his life, the Air Force has invested in him some \$22,500 and has received 1½ years of productive effort.

That is the way they analyze it. In a 4-year man they start getting productive effort back from him in the last 1½ years of his first enlistment. This airman, like so many of our technicians, General Wade continued, has no trouble getting a job that will start him out at a salary paying 2 to 6 times as much as the Air Force can pay him.

What would be your comments on that, General?

General DOOLITTLE. I believe the most serious problem with which the Strategic Air Force is faced today is the acquisition and retention of competent mechanics to maintain the aircraft, the engines, and the electronic equipment, and anything that we can do to retain these people after they have been trained and get them to reenlist is a desirable thing to do.

Senator SYMINGTON. What would you suggest?

General DOOLITTLE. Certainly one thing is money. The Air Force is doing everything they can within their own organization. An increase in pay would be desirable.

Senator SYMINGTON. General Wade's testimony continued:

The 1951 force was, in our opinion, the strongest and most competent force personnelwise that we have ever had in the Strategic Air Command. Please note how this force of 113,000 is depleting itself, and we will expect to retain by December 31 of this year—

that is December 31 last year—

only some 13,000 out of the 113,000 we had in 1951.

The testimony continues:

Without going into the details, you can see the type of input that we had each year.

Then he said:

In December of this year we will have approximately 170,000 airmen in the commands, of which 77,000, or 45 percent of our strength, will be in their first year in SAC. Another 45,000, or 26 percent, will be in their second year. In

other words, 71 percent of our strength will have less than 2 years in the Strategic Air Command.

General LeMay testified that he discussed the situation with the president of one of the leading airlines. He said:

What would you do in a case like that?

And the president of this airline, specifically, Mr. Patterson of United Air Lines said:

I would never let an airplane leave the ground.

What are your comments about that?

General DOOLITTLE. It is necessary to take certain risks in our Military Establishment that we would not take in a commercial airline. On the other hand, those risks must be minimized or we are remiss in our duty.

Senator SYMINGTON. The more risks you take with an insufficiency of educated mechanics, for example, the greater number of unnecessary accidents you are going to have, isn't that correct?

General DOOLITTLE. That is correct, and you have the loss of life, and not only that, but a loss of equipment which would cost much more than the higher pay for the mechanic.

Senator SYMINGTON. Also, if you have that type and character of abortion in your actual efforts in SAC, then you do not have the defense security that you normally would think that you did have?

General DOOLITTLE. That is correct.

Senator SYMINGTON. Or that the people might think that we have, is that correct?

General DOOLITTLE. That is correct.

Senator SYMINGTON. Are you familiar with the Cordiner report?

General DOOLITTLE. In a general way.

Senator SYMINGTON. What do you think of it?

General DOOLITTLE. I think it will do a great deal to help the services.

Senator SYMINGTON. I have no further questions, Mr. Chairman. Thank you.

GOVERNMENTAL RESPONSIBILITY IN FIELD OF EDUCATION

Senator JOHNSON. Senator Bush?

Senator BUSH. Mr. Chairman, I have been interested in all that the gentleman has had to say this morning, very much so. Most of the questions I had in mind have been already answered.

I would like, however, to ask the general, going back to the question of education—and I think he has put into the record some very valuable information about our education at the high-school level, particularly in the sciences and in mathematics, very useful information. I would like to ask the general what he thinks that the Federal Government should do to correct this situation which he regards as so dangerous? And, of course, what the general said today was said in somewhat different terms yesterday by Dr. Teller and Dr. Bush. Now, has the general any specific recommendations as to what should be done at the Federal Government level by the Congress to help correct that situation in the high schools, in stimulating the retention, the development and retention of better teachers and requiring more and better teaching of mathematics and the sciences and requiring

more people to take these courses so as to give us a field from which we can draw material for our scientific professions? Have you any specific suggestions as to what the Federal Government and the Congress might do in that field?

General DOOLITTLE. Mr. Bush, I have some very definite ideas on what is wrong, but I have not yet thought through the best remedial action to be taken to correct it.

Senator BUSH. The problem is a difficult one for us to deal with because, as the general knows, the business of education at the elementary- and high-school level is largely one where the responsibility lies with the towns and cities and with the States, so that our problem is not a simple one. I think we would welcome any advice that you may later care to give upon reflection as to how far the Federal Government should go in invading that field in order to correct that situation.

It might be worth taking up with your committee because it is such a vitally essential point in connection with the committee's responsibilities.

General DOOLITTLE. I am satisfied that to correct the deficiencies in our educational system will require a great deal of money. Whether that money should come from the municipality, the State, or the Federal Government, I am not prepared to say.

Senator BUSH. I have no other questions, Mr. Examiner.

DISTINCTION BETWEEN DESIRABLE AND WASTEFUL DUPLICATION

Senator JOHNSON. Senator Barrett?

Senator BARRETT. General Doolittle, I would like to ask you to comment on a problem here which bothers me. You stated that the progress in Russia in the missile field is greater than ours and then you mentioned that the coordination, insofar as the IRBM's—the Thor and the Jupiter—are concerned, should be resolved. I have in mind that we do have some duplication of effort in the ICBM—the Atlas and the Titan. I have been wondering whether or not there is duplication in Russia in that field also while it might save some money if that might not be the means of making the progress you desire, by having duplication of effort in the IRBM—the Thor and the Jupiter and the Atlas and the Titan in the ICBM?

It is my thought that that is precisely what we did with the atomic bomb. We had not only duplication but triplication of effort in that field, so I have been given to understand. Maybe that is how we made the progress in that project at that time. Maybe we can make it here in the intercontinental missile, in the intermediate range missile, by duplicating the effort.

I would like to have your comments on that, General Doolittle.

General DOOLITTLE. I would like to point out, Mr. Barrett, that in the bomb there was a great deal of duplication because it wasn't known whether it could be made at all or not, and so the exigency of the situation was such that several different methods of approach were tried, and it happened that all of them proved successful. Some were better than others, and so they were standardized on.

That to me is necessary duplication, not wasteful duplication. In the case of the Atlas and the Titan, an evaluation had to be made as to what would be the cost of going ahead just with the Atlas. Then

an evaluation of what would be the cost of going ahead with both programs. When it gets into the area of production, it will not cost much more to make one type than the others; and, as a matter of fact, it will not cost much more to make two types, if the number to be made is sufficiently great. Your production curve flattens off at the top, someplace there you can make several different types.

Certainly, the developmental cost will be considerably greater, but you are developing two items and you are making sure that out of this will come one that will work entirely satisfactorily; and I do not consider that that duplication in that case is wasteful. It has been very carefully analyzed, and sometimes we have to spend additional money to make sure that a developmental project will be satisfactory.

Senator BARRETT. Do I understand that the duplication in the IRBM is not wasteful, but necessary?

General DOOLITTLE. I believe we could make faster progress and save money if we could put all of the people who have been working on both projects on one and wash out the other one.

Senator BARRETT. So you would leave it up to the Secretary of Defense to select one or the other?

General DOOLITTLE. Yes, sir.

Senator BARRETT. Thank you very much.

Senator JOHNSON. Does that conclude your questioning, Senator Barrett?

Senator BARRETT. It does. Thank you, Mr. Chairman.

Senator JOHNSON. Counsel, do you have any additional questions? Mr. WEISL. I do not.

STRATEGIC AIR COMMAND SHOULD BE MODERNIZED EXPEDITIOUSLY

Senator JOHNSON. Does any Senator have any other question of General Doolittle?

Senator SYMINGTON. Mr. Chairman, I have one further question I would like to ask.

Senator JOHNSON. Senator Symington.

Senator SYMINGTON. General, you have mentioned, as did witnesses yesterday, the importance of SAC. It is true also this missile problem is a very important problem, and there will come a time when we will have more missile strength—the ICBM I think we both know we will not have operational for some years to come. However, we cannot fight with weapons we don't have.

If this country is attacked, it has to defend itself with existing weapons; does it not?

General DOOLITTLE. That is right.

Senator SYMINGTON. Therefore, the more modern that the Strategic Air Force is in its planes, the better for the security of the United States, is that a fair statement?

General DOOLITTLE. That is a fair statement.

Senator SYMINGTON. You and I have been through the question of the B-36 over many years. With all due respects to that airplane and, it is a fine airplane, but it was designed in 1941 after the Nazis overran the lowlands. It has performed its job to the best of its ability. It is now getting somewhat obsolete; is it not?

General DOOLITTLE. I should say it is obsolete.

Senator SYMINGTON. Mr. Chairman, I have not discussed this matter with General Doolittle for many months, but the fact is that we have a number of wings of B-36's still in SAC. It is important to replace those wings with more modern airplanes; is it not?

General DOOLITTLE. That is right.

Senator SYMINGTON. Then what justification do you think there is after sputnik not only in not accelerating the production of B-52's, for example, but also in not restoring the cuts in the production schedules that have been made in the year 1957, this year? Do you not think that ought to be changed?

General DOOLITTLE. I believe we should have 2 programs, Mr. Symington, 1 a program of modernizing SAC with modern known or proved types of airplanes that should go forward with all possible expedition.

Paralleling that should be the program of developing missiles to supplement and later to, in part, replace those weapons.

Senator SYMINGTON. I understand that, and I agree with you. The question that I am asking is, do you not think that the reductions that were made in the production schedules for B-52's in the year 1957, should be restored? That would not even be an acceleration of the program. That would just be replacing the amounts cut out earlier this year.

General DOOLITTLE. I would like to see them restored. However, I was not in the position to have to take everything into consideration that caused that curtailment of budget.

Senator SYMINGTON. If this curtailment is purely a fiscal situation, do you not agree that the situation as it now is, based on your own testimony, is such that we can afford to have a modern SAC, not only in people but also in planes?

General DOOLITTLE. I do agree.

Senator SYMINGTON. Thank you, General.

Senator KEFAUVER. Mr. Chairman, may I ask one question?

Senator JOHNSON. Senator Kefauver.

Senator KEFAUVER. General Doolittle, in your opening statement you said that some of the things that had to be done involved some new legislation or additional legislation, and I did not know if you had specified just what you had in mind.

General DOOLITTLE. No, sir. What I meant to say was that some things, some changes, could be made within the existing structure of the Defense Department. Some changes might require legislation. I did not detail what they were.

Senator KEFAUVER. Are you in a position to give us any more details or generalizations about the legislative changes that you think we should be considering?

General DOOLITTLE. No, sir; I am not prepared on that.

Senator KEFAUVER. Very well. Thank you.

SHORTAGE OF SCIENTISTS AND ENGINEERS

Senator JOHNSON. General Doolittle, in your opinion, is there a present shortage of scientists and engineers for the military programs?

General DOOLITTLE. Certainly; we could go faster if we had more.

Senator JOHNSON. Do you think it might be advisable to work out some arrangement with industry where industry would lend them or give them leave for Government service, if they were needed?

General DOOLITTLE. Industry could make a very substantial contribution.

Senator JOHNSON. And you think that should be done?

General DOOLITTLE. I think the exigency of the situation is such that it should.

Senator JOHNSON. And you think there is no question but what it is needed?

General DOOLITTLE. No question but that it is needed and no question but that we have to make some sacrifices, and that is one of the sacrifices we can make.

SUMMARY

Senator JOHNSON. So, General, summarizing, you would accelerate the missile program by increasing the funds available for it. You would attempt to effectuate better coordination that would give the program more efficiency and more speed through a national coordinating agency. You would attempt to cure the present shortage of scientists and engineers by asking industry to make available some of their people to Government when and as needed.

Is that a fair summary of your statement?

General DOOLITTLE. That is correct. That is a fair summary, yes, sir.

Senator JOHNSON. That is what you think can be done and should be done and must be done now?

General DOOLITTLE. Yes, sir.

Senator JOHNSON. Are there any other questions of General Doolittle by any member of the committee?

General, the committee is very grateful to you for coming here this morning. There are not very many men who are capable of achieving distinguished careers in so many different fields. It is a sign of the strength of our Nation that we have such men as you. In listening to your clear exposition of your views, there is a thought that has run through my mind all morning. We are talking here about short-range objectives and long-range objectives as though they were completely separate.

It seems to me that one of our short-range objectives must be to get busy on the long-range objectives immediately, now.

General DOOLITTLE. That is right.

Senator JOHNSON. We cannot become so engrossed in the purely short-range objectives that we forget about the future or postpone it. Your testimony which has outlined so well the conditions which led to our present situation brings this point home forcefully.

General Doolittle, the Nation has good cause to be grateful to you for your outstanding services which have spanned so many years. Not the least is the contribution that you have made to your country in your testimony to this committee this morning.

General Doolittle, on behalf of the members of the Armed Services Committee and the subcommittee in particular, I want you to know that our gratitude is deep.

General DOOLITTLE. Thank you very much, Mr. Chairman. Thank you very much, gentlemen.

Senator JOHNSON. The committee will take a 5-minute recess.

(Short recess.)

Senator JOHNSON. The committee will come to order.

Our next witness is Dr. John Hagen.

Dr. Hagen, will you please come to the witness chair? Raise your right hand.

Do you solemnly swear that the testimony you shall give shall be the whole truth and nothing but the truth?

Dr. HAGEN. I do.

TESTIMONY OF DR. JOHN HAGEN, DIRECTOR, UNITED STATES NAVY PROJECT VANGUARD; MEMBER, PANEL ON RADIO ASTRONOMY, NATIONAL SCIENCE FOUNDATION, AND FORMER CHAIRMAN, ASSOCIATION OF UNIVERSITIES STEERING COMMITTEES

Senator JOHNSON. Our next witness is Dr. John Hagen, a distinguished astronomer and Director of the Navy's Vanguard project, otherwise known as the earth satellite program.

Dr. Hagen is a native of Canada. He received his bachelor of science degree from Boston University in 1929, and his master of arts degree from Wesleyan University in Middletown, Conn., in 1941.

In 1949, he was awarded a doctor of philosophy degree by Georgetown University.

From 1931 to 1935, Dr. Hagen was a research associate at Wesleyan University. At the Naval Research Laboratory he was Superintendent of the Atmosphere and Astrophysics Division, and worked with the development of microwave radar and radio astronomy.

Dr. Hagen has been associated with the Naval Research Laboratory in Washington since 1935.

Dr. Hagen, it is a pleasure to have you before this committee, and we look forward with eager anticipation to your testimony.

I should say for the benefit of the members of the committee that Dr. Hagen will be examined by our associate counsel, Mr. Cyrus Vance, distinguished partner in the firm of Simpson, Thacher & Bartlett.

EXPLANATION OF VANGUARD PROJECT

Mr. Vance?

Mr. VANCE. Dr. Hagen, as Director of the Vanguard program, will you explain what is the Vanguard project and how it fits into the International Geophysical Year?

In this connection, I think it would be helpful if you would first explain what is the International Geophysical Year.

Dr. HAGEN. The International Geophysical Year is a large scientific program designed to do work in geophysics in most of the countries on the face of the earth. I think the number of adhering countries is just over 60.

This kind of endeavor started in the 1880's. I think it was 1882 when the first Polar Year was held. That was a cooperative venture on a much smaller scale.

Then 50 years later, in 1932, the second Polar Year was held. This became a somewhat larger effort and, as we all well know, we had expeditions, for example, to the Antarctic headed by Admiral Byrd.

After the Second World War, an American physicist, Lloyd Berkner, realized that there had been large and very rapid advances in geophysics and astronomy. He knew also that there was to be a

period of maximum solar activity in the years 1957-58, and he proposed that we not wait 50 years for the third Polar Year, but hold it after only 25.

This recommendation was made to international scientific bodies, and there was enthusiastic reception of the idea. The venture became of such proportions that it grew beyond the Polar Year, and it was renamed the International Geophysical Year.

The adhering body in this country is the National Academy of Sciences.

Mr. VANCE. What is the National Academy of Sciences?

Dr. HAGEN. The National Academy of Sciences is a quasi-governmental organization set up by Federal charter, I believe at the time of President Lincoln, when we were in difficulties in the Civil War.

It is made up of leading scientists from nearly all of the fields of science. They serve, among other things, to advise the Government, when requested, on scientific matters.

Mr. VANCE. Dr. Hagen, since this is a scientific project, why is it under the management of the Department of Defense?

Dr. HAGEN. When the proposal was made that some country put a scientific satellite in a semipermanent orbit around the earth as a part of the IGY, it was considered here. A special committee of the National Academy of Sciences and the National Science Foundation studied the feasibility of the project, and determined that it was feasible, with the then known techniques, to put a satellite in an orbit.

They approached the White House with the proposal. The executive department turned to the Department of Defense to implement the program because the Department of Defense had had a wide background in upper atmosphere research; and within the Department of Defense, much of the work of probing the upper atmosphere with rockets had been done at the Naval Research Laboratory. For this purpose special rockets had been designed after we had exhausted the supply of captured V-2's. The new rockets—you are familiar with the names, I am sure—were the Aerobees and the Vikings.

I think this project was put within the Department of Defense because of the experience, not only in the instrumentation and use of rockets, but in the management of this type of project.

Mr. VANCE. What was the specific job which you were given to do?

Dr. HAGEN. As the Director of Project Vanguard, the job that was assigned to me was, first, to put a satellite in an orbit within the time of the IGY; second, to so instrument it and so arrange here on the earth that it could be observed and proven to be in an orbit and third, to so instrument it that useful scientific work could be done in the satellite.

Mr. VANCE. What is the time of the IGY?

Dr. HAGEN. The IGY began in July of 1957, and will continue through December 1958.

PUTTING A SATELLITE INTO AN ORBIT

Mr. VANCE. Would you please describe the launching vehicle, and how it puts a satellite into an orbit?

Dr. HAGEN. Yes, sir. I have some charts here which might help in doing that.

The choice that was made for our participation was to build a launching vehicle developed out of the Viking rocket, which was an atmospheric research probing rocket.

In order to put a satellite in an orbit, it is necessary to do two things: The first of them is to lift the satellite the required distance above the surface of the earth, in this case two or three hundred miles; the second is one has to give it the horizontal velocity that is needed to keep it there in spite of the earth's gravity. That velocity is some 5 miles per second.

Now, the launching vehicle, of which I have a model—I think you can see it best with a model—is constructed in three parts. It is a 3-stage vehicle, some 72 feet long, and it weighs about 22,000 pounds.

The first stage is nearly all tankage for the kerosene and the liquid oxygen which we use as propellants. Down here, the small motor that develops a thrust of 27,000 pounds. After this rocket goes vertically into the air, as you can see on the trajectory over here, about 35 miles, the first stage will burn out. And since it is no longer needed, it falls off into the sea.

The second stage again is a liquid-propellant rocket, smaller than the first. It burns for another couple of minutes, and during that time the nose cone, which protects the satellite and also helps the rocket to go through the dense lower atmosphere is thrown away. The second-stage rocket then burns out and coasts for some several minutes until it is about 300 miles above the surface of the earth, and is properly oriented parallel to the surface of the earth. At that time it is nearly a thousand miles away from the launching point, and then the third stage is ignited.

The third stage is actually set spinning to stabilize it, and then it burns for thirty-odd seconds; and in that time more than half the total required velocity is imparted to the satellite, which is on the nose of the third-stage rocket. In the meantime, the second-stage casing, which has fallen away, follows a ballistic trajectory and falls into the sea some 1,500 miles from the launching point.

When the third stage has finished burning, and if it has gone in the right direction and has had imparted the necessary velocity to the satellite, its empty casing and the satellite will stay in an orbit.

We intend to separate them so that the satellite will go off by itself, and the scientific experiments will not be interfered with by the casing.

ORBITS

Mr. VANCE. I think it would be helpful if you would please tell us in a general way something about orbits.

Dr. HAGEN. I think it is best to start with the moon. The moon is in an orbit around the earth. It is a satellite of the earth. And since it is some 250,000 miles away from the earth, the atmosphere there is practically nonexistent. The moon's orbit is pretty steady and predictable.

We are now trying to make a small manmade moon. The principal difference is that it will be very much closer to the surface of the earth. We hope that our satellites, when they get in orbit, will not be closer than 200 miles to the surface at any time, and will not be farther away than about 1,400 miles.

An orbit around the earth does not necessarily have to be circular. It is circular only in a special case. In all of astronomy, the orbits

of planets around stars or of satellites around planets, in general, are elliptical. The satellite really sees the earth as a point, once it gets into its orbit, and the plane of the orbit will always contain the center of the earth.

As this chart shows, the earth turns around under the satellite. The order is top left, and then on to bottom right. Shown here four successive revolutions. The earth, spinning under the orbit, moves to such an extent that instead of passing over Cape Canaveral in Florida, by the time the first revolution is completed the satellite passes farther to the west. By the time the fourth revolution is completed, the earth has rotated so that the satellite will pass over the Hawaiian Islands and the southern part of South America. Once objects are in orbit, they are independent of the rotation of the earth, but they are carried around the sun with the earth.

Mr. VANCE. We read things in the press about the desirability or lack of desirability of circular and elliptical orbits. Could you comment on that?

Dr. HAGEN. Yes. Our purpose in putting a satellite out there is to conduct scientific experiments. We want to study the upper atmosphere, the very outermost parts of the earth's atmosphere. We also want to study the radiation coming in from the sun and from other parts of the universe, study this radiation outside of the atmosphere; our atmosphere is really an absorbing blanket, and is transparent only in the visible and parts of the radio spectrum.

To do these two jobs, it is probably just as well to have an elliptical orbit as to have a circular one. It would depend somewhat upon the specific experiment you are talking about, but in general all experiments would benefit by having the orbit elliptical rather than circular, because then you study different heights.

TRACKING SATELLITES

Mr. VANCE. How and when will you be able to tell whether the Vanguard satellites are in orbit?

Dr. HAGEN. Are in orbit?

Mr. VANCE. Yes.

Dr. HAGEN. Soon after we launch. We have a tracking system which extends down along the 75th meridian with stations all the way from near Washington, D. C., down as far as Santiago, Chile. We also have a station out on the British island of Antigua in the West Indies.

In launching the vehicle from the Air Force Missile Test Center in Florida, we are launching down along the chain of islands that is the West Indies. There is a safety problem here, and we do have to avoid going over particular islands. However, it is in that general direction.

And so, about 10 minutes after the vehicle is launched, the third stage will have burned out. If we have established an orbit, we should know it by observation at Antigua, for by that time, the satellite will be radiating from its own radio station, and will be passing over Antigua. As it goes over South Africa where there will be another minitrack station, we will get a better reading. And by the time it goes pretty nearly around the earth and goes over San Diego, Calif., we can tell with assurance.

Thus, within 90 minutes we will certainly know whether we have a satellite in an orbit.

Mr. VANCE. Dr. Hagen, how do you get information out of the satellite? How do you track it?

Dr. HAGEN. In the satellite there will be a small radio station. We call that the minitrack oscillator, the minitrack system, which is the system of radio receiving stations shown on the chart.

This small radio station is to be modulated by the information collected by the scientific equipment, the receivers placed on the ground can pick up the information, in its modulated form, demodulate it, and relate it to the readings taken by the instrument in the satellite.

At the same time, since this radio station is radiating continuously, we can effectively direction-find on it. We do this by means of fixed antennas. However, we do continuously measure the instantaneous position in space and time of the object as it goes overhead. All of this information is then rapidly disseminated over a very complex communications system back to a control center here in Washington, and when properly filtered it is sent into a computing center where the orbits are computed and predictions are made on future passages.

The overall network that we have had to set up you can see on this chart here. The outer rings are the various observation stations and each of them is connected through a communications system to the central hub of the scheme, the Vanguard Control Center. That in turn connects with or is in constant touch with the computing center, and also with the optical tracking people of the Army Map Service.

Mr. VANCE. What are your commitments with respect to releasing scientific information to be obtained during the tracking?

Dr. HAGEN. The United States has proposed, and I think basically committed itself, through the National Academy of Sciences, to the international IGY organization, to release within 2 hours of the time of a launching a statement as to its success, and as soon afterwards as possible, of course, the information about the course of the object in the sky.

Mr. VANCE. That may be any time during the International Geophysical Year?

Dr. HAGEN. As far as the orbit information is concerned, it could be any time, but it would be practically useless unless it were done soon.

VANGUARD SATELLITE LAUNCHING SCHEDULE

Mr. VANCE. Now you have stated that the objective is to establish a satellite during this year.

Could you tell us something about the launching schedule?

Dr. HAGEN. I should go back a bit, I think, and explain the development of the vehicles so that you will understand where they fit into the schedule.

As I pointed out in the beginning, we developed this three-stage vehicle to do the specific job. It is not an off-the-shelf item. We therefore had to test all of the component parts during the course of the development, and so our vehicle launching schedule is really in two parts: the first part is a test vehicle schedule wherein we flight-test the different engines that are in the series and flight-test the operation of the electronics. This part has 5 or 6 vehicles in it.

The second part of the schedule contains what we call the satellite launching vehicles. These are identical, and have the capability of putting a 20-inch, 21½-pound sphere in an orbit.

Now we are in the middle of our test vehicle schedule.

The first vehicles, intended to test the separate components, have been flown, and we are now on the verge of flying the first of the three-stage vehicles.

During the course of the early test program the flight of the vehicle testing the third-stage engine was so successful, and the operation of the engine itself was so successful, that we were able to change the nature of the remaining test vehicle program. In place of heavy nose cones filled with measuring instruments, we were able to use a 6-inch sphere, of which this is a model.

This small sphere now contains two minitrack transmitters. Putting that small light sphere on the test vehicle third-stage in place of a heavy nose cone the vehicle has the capability of putting the sphere in an orbit if all parts of the test go smoothly and the operation of all motors is up to par.

We are at that phase now. We have the first of the three-stage vehicles well along in its processing and we are readying it for launching. It will be launched sometime during the month of December. It will then be followed by two more test vehicles of the same kind.

After that, by the month of March, we will be prepared to launch satellite launching vehicles with the full-scale IGY satellite in them.

Mr. VANCE. Could you give us a general picture of the operations which will be required in connection with the launching vehicle?

Dr. HAGEN. Yes. The most difficult part perhaps of this whole program is right there. Actually this vehicle that we are using for the satellite launching is in many ways more complex than some of the single-stage missiles with which we are familiar. In preparing a vehicle like this for launching, one must go over it in minute detail and check each component part to make sure that each is completely in accord with its specifications and is operating properly. After that he must assemble the vehicle and burn the engines with the vehicle clamped down to a stand, to make sure that the sequence of operations is correct.

Before he comes to the launching he must check all of the electronics. In an automobile you have a speedometer and other gadgets on the panel which you can look at, and even those of us who are not automotive engineers need those gadgets in order to drive our cars properly. In the same way there must be gadgets in these missiles which you must read, so there is an elaborate telemetering system in the missile which broadcasts information about the operation of the various parts.

This whole electronics system has to be checked out before the vehicle is prepared for launching.

In the checkout if you put on paper, as we have done, all of the sequential operations that must occur, each successfully, in order that the vehicle get off the stand and do what it is supposed to do, the list of operations strings out to the length of the table before which you sit. All of these things then you see must be doubly checked before the vehicle flies. Then as you get ready to launch it, you must fuel the vehicle, recheck, and you are ready to go.

The picture over here is of the flight of TV-2—test vehicle 2—which is the first vehicle having the Vanguard configuration. That is, all of our vehicles now will look exactly like that. The vehicle is a second or two away from the stand in the photograph. The engine is, as you see, burning with the flame straight down. All of our tests at Patrick to date have been successful. They have more than exceeded our expectations, and it is the success of these earlier vehicles that gives us confidence that we are going to go along successfully with the more complicated three-stage vehicle.

Mr. VANCE. Dr. Hagen, prior to the launching of Sputnik I to your knowledge was any consideration given to trying to speed up the Vanguard project?

Dr. HAGEN. Yes, sir. You will recall I said we changed our launching program. The flight of the vehicle which flew the third stage for the first time, was in May of this year. After the data had been analyzed and it became clear that we indeed had in this one trial solved all the problems involved, we did that which would speed the program up and give us an orbiting vehicle at the earliest possible time, and that was to get rid of the heavy nose cone and substitute this small subsatellite. We made the decision to do that about the 15th of July, which was some months before sputnik.

PRIORITY—LIMITATION AND PROGRESS

Mr. VANCE. In your opinion have we gone ahead as fast as we could or should in our Vanguard project?

Dr. HAGEN. Well, sir, there has always been a great sense of urgency on the part of the people working in the project.

The only limitation on speed, I think, here has been that based upon the decisions made earlier on priority and on the adequacy of funding for the project.

Senator JOHNSON. What is your answer to the question, Doctor?

Dr. HAGEN. Pardon?

Senator JOHNSON. What is your answer to his question?

Dr. HAGEN. I thought I had answered it, sir.

Senator JOHNSON. I did not get it if you did.

How did you answer it?

Dr. Hagen. I would like you to ask me again if you don't think I answered it.

Senator JOHNSON. Would you restate it again?

Dr. HAGEN. I say there has been a sense of urgency always within the project and that the project has been handled within the limitations set upon it in the beginning, of priority and of the availability of funding.

Mr. VANCE. What were those limitations?

Dr. HAGEN. The limitation on priority was that the project must never interfere with our higher priority ballistic-missiles projects. It had a secondary priority classification.

Mr. VANCE. Were there any other limitations?

Dr. HAGEN. The project was funded, as you know, from the emergency fund, the Secretary's emergency fund, until quite recently when it was justified before Congress and it was then funded to completion by action of the congressional committees.

Mr. VANCE. In your opinion if these limitations had not existed, could the project have been speeded up?

Dr. HAGEN. I think if, in the very beginning, this country had decided that it was urgent to complete the satellite project at the earliest possible date and had taken the necessary actions to make this possible, certainly we could have speeded it up; yes.

Mr. VANCE. Do you think that you could have gotten it up ahead of Sputnik I?

Dr. HAGEN. The answer to that is a hypothetical one. I believe we would have had a good chance of doing that.

Mr. VANCE. What is your best opinion?

Dr. HAGEN. I think that we probably would have come very close to the same time, if not ahead of it.

SCIENTIFIC INFORMATION

Mr. VANCE. Dr. Hagen, since the object of the Vanguard project is to get scientific information, I think it would be helpful if you would explain more fully what is the scientific information which will be obtained from the Vanguard project?

Dr. HAGEN. The scientific program laid out for the satellite project in the IGY has been determined by a panel of the National Academy of Sciences.

The panel is under their Committee for the IGY which is headed by Professor Kaplan. Out of a tremendous number of suggestions as to good experiments that should be done, they have built their program around 4 satellite packages, and it is easier to explain the thing in terms of the 4 satellite packages.

Mr. VANCE. Please do.

Dr. HAGEN. Once they chose the experiment and chose the experimenters, the laboratories or the universities which would conduct these experiments, then funds were allocated to these people. The experimenters worked in conjunction with our group in project Vanguard where the instrumentation of the experiment was done.

As you can recall from the chart over there of the sphere, in the central compartment there were the minitrack oscillator, the batteries, and the modulators; these were connected to the experimental equipment with the help of our people.

In the first package, the chief experiment or the principal experiment, is that of the measurement of the ultraviolet radiation from the sun. The earth's atmosphere absorbs the principal part of this ultraviolet radiation. If it were not for the earth's atmosphere, our skins would be burned to a crisp in a short time.

The sun is very active in the ultraviolet, and it is of great interest to a great many fields of science to understand the variation in this ultraviolet radiation. And so the idea here is to put a detector of ultraviolet radiation in the satellite and let it stay up in the air some 2 or 3 weeks at the least and get sequential measurements of the ultraviolet radiation.

In addition, in that first package there are several experiments which will measure the satellite's environmental conditions. We are tremendously interested in the environment that exists outside the atmosphere. Our interests—we will probably say more about that later—can best be served by making the direct measurements as early as possible. So in this first package we will be measuring temperature, pressure, erosion of the surface by micrometeors.

There will also be microphones on the package which will detect individual collisions with micrometeors. By these means, then, we will study the outside atmosphere.

Senator JOHNSON. Dr. Hagen, if you will permit, the committee will take a recess until 2:30.

We will resume at this point at 2:30 p. m.

(Whereupon, at 1 p. m. the committee was recessed, to reconvene at 2:30 p. m. of the same day.)

AFTERNOON SESSION

Senator JOHNSON. The committee will come to order.

For the information of the members of the committee and the press, at the conclusion of Dr. Hagen's testimony, we will go into executive session and meet in the Armed Services Committee Room to hear the Director of Central Intelligence, Mr. Allen Dulles. At the conclusion of his testimony I will meet with the press and tell them anything that I may be able to as a result of that testimony.

Dr. Hagen, we appreciate very much your coming back to be with us this afternoon.

We are very proud of the quality of testimony that has been adduced thus far in the hearing.

We have had witnesses whom we believe are dedicated to the best interests of this Nation. They did not come from the White House or the Pentagon or Congress. They came from all walks of American life.

Before these hearings are concluded, we are going to ask each branch of the military services, the Army, the Navy, and the Air Force to come and testify. They will receive a full opportunity to present all facts relevant to this inquiry in both open and closed hearings.

Each branch of the military service has already been examined by the staff of this committee, and further examination will take place within the services between now and the time the committee resumes on December 13.

To illustrate, in the Navy, Secretary Norton, Admiral Burke, Chief of Naval Operations, Admiral Clark and Admiral Hayward in charge of research and development, Dr. Thomson, civilian research adviser, and many other officers and advisers have been interviewed.

The Navy will get a full opportunity to present its case to us in both open and closed sessions.

In the Army, General Medaris, General Gavin, Dr. von Braun, the head of the Jupiter missile project at Redstone; Dr. Martin, civilian head of research and development of the Army, as well as many other Army officers and civilians, have been interviewed.

The Army will be given every opportunity to present its position to this committee fully and adequately in open and closed sessions.

In the Air Force General White, General LeMay, General Putt, the head of research and development, both military and civilian, have been interviewed. As in the case of the Navy and the Army, the Air Force will get every opportunity to present its case before us.

I think that all of you must realize a great many man-hours have gone into interrogation and interviewing prior to the presentation of the witnesses.

The defense and budget departments have been studied by our staff. These departments will be fully examined to give them every opportunity to present all relevant facts to this committee.

This Preparedness Subcommittee will reach no premature conclusions and has no preconceived notions. When all the facts are presented they will be studied and a fair report of recommendations and conclusions will be made to the full committee in the event the subcommittee feels that it is desirable and in the national interest to do so.

Dr. Hagen, we thank you for indulging us. Counsel, will you proceed with the examination of the witness?

TESTIMONY OF DR. JOHN HAGEN—Resumed

VANGUARD SATELLITE EXPERIMENTS

Mr. VANCE. Dr. Hagen, would you please continue with your description of the experiments in connection with the Vanguard project?

Dr. HAGEN. As I recall, I said there were four separate packages, and I think I have described the first.

The second package was to have been a cosmic-ray experiment. The factors back of the experiment are these: Cosmic rays are particles coming in from outer space at high velocity. They do not penetrate our atmosphere in their primary condition. They come into the atmosphere, collide with the molecules of the atmosphere, and then secondary cosmic rays strike the earth.

In order to have a complete understanding of these cosmic rays and from that a better understanding of the universe, we need to study the primary cosmic rays outside the atmosphere; so in this second satellite there were to be detectors which would measure and study the primary cosmic rays. In addition, in this package, there was planned a meteoric detection experiment.

Now, the program has recently been changed, and in place of this cosmic ray experiment, which now goes over to the Army program, we have substituted a meteorological experiment which is being conducted by the Signal Engineering Laboratory of the Army. In this experiment there are 2 or 3 photocells in the satellite, of a rather simple telescope type construction. As the satellite spins and revolves around the earth, they scan the surface of the earth to give us a picture of the cloud cover around its equatorial belt, within the hundred minutes or so that it takes the satellite to complete an orbit.

This is a very important thing for the meteorologist. Never before has it been possible to calculate the total heat input into the atmosphere and thereby make a scientific study of the heat engine which is the atmosphere, and therefore be able to predict the weather more precisely.

(At this point a light bulb fell from a chandelier before the committee table.)

Dr. HAGEN. I think that was the casing. [Laughter.]

Senator JOHNSON. Is that a part of your project?

Dr. HAGEN. No, sir; I think that is one of those strange flying objects. [Laughter.]

Well, in any event, then, there is this second experiment which is now meteorological and will give us a much better understanding of the earth's weather.

The third package is one containing magnetometers which will allow us to measure the earth's magnetic field at some distance above the earth. This experiment is being conducted by the Naval Research Laboratory.

As you may know, the earth's magnetic field is due not only to processes within the earth, but also to currents in the ionosphere. The earth's field varies and causes us some difficulties in communications. It is important to understand what causes these variations. One of the theories is that there is a ring of current in the ionosphere which has an intensity of thousands of amperes and is caused by the electrons and protons coming from the sun.

The measurement of the field with the satellite at a height of 200 or 300 miles will allow us to determine whether in fact there is such a current, and thereby to have a much better understanding of the earth's magnetic field.

The fourth package is a meteorological experiment in which the University of Wisconsin is placing radiometers out at the ends of the satellite antennas. These radiometers will measure the total radiation from the sun, the reflected radiation from the earth, and the earth's heat radiation. All of these things together, then, in conjunction with that second experiment, will give a much, much more complete picture of the earth's weather.

Now those are the four particular experiments that are planned for the IGY and, as you can see, they are all geophysical experiments. This program was designed in the beginning as, and is being conducted as, a geophysical experiment with some astronomy.

There are other experiments that should be done before a man could safely go up into space. Some of these are the environmental experiments that were referred to in the first package.

There are other things like the problems of recovery, of navigation, of a more complete picture of the high energy radiation, of the effects of weightlessness, and things of that nature, all of which should be studied before we think of going beyond the IGY series of satellite experiments.

Mr. VANCE. It is your recommendation that this should be done?

Dr. HAGEN. I surely do recommend that it be done, and that a very carefully coordinated program be set up as soon as possible to see that we do go into it in a well-thought-out and planned way.

VANGUARD PRIORITY REQUEST

Mr. VANCE. Before going into the next topic, I want to ask you, Dr. Hagen, whether or not you ever asked for top industrial priority with respect to the Vanguard project?

Dr. HAGEN. Early in the project—I think I explained earlier that those of us in the project have always had a sense of urgency about this thing—we did request top priority or high priority for the project so that we could get along at the maximum possible speed.

Mr. VANCE. When did you make that request?

Dr. HAGEN. I cannot give you the exact month, but it was sometime late in 1955 or early in 1956.

Mr. VANCE. To whom did you make the request?

Dr. HAGEN. Well, in the organization in which we work, our requests go through the Office of Naval Research and from there they go on up through the Navy Department to the Department of Defense.

Mr. VANCE. Was your request granted?

Dr. HAGEN. No; it was not, in the form in which we asked it.

Mr. VANCE. Do you know who made the decision not to grant it?

Dr. HAGEN. I do not know.

Mr. VANCE. Did you subsequently make any recommendations with respect to speeding up your launching schedule?

Dr. HAGEN. Yes; we did.

If you will recall, I said that the flight of this third stage was extremely successful, and at that time we saw an opportunity to advance the date when we could possibly put an object in an orbit, and the way we could do that within the program as it then stood was to change the later vehicles and put the small satellite on them.

I think it is obvious, in answer to a question that I think Senator Johnson was after earlier, that had this project in the beginning been conceived of as a top priority project, then certainly we would have gone ahead faster than we did under the limitations under which we worked.

Mr. VANCE. That was your recommendation?

Dr. HAGEN. Yes.

REQUESTED LAUNCHING SCHEDULE SPEED UP

Mr. VANCE. Now you spoke of this second recommendation, speed up the launching schedule.

To whom did you make that recommendation?

Dr. HAGEN. By that time, the Department of Defense had named Mr. Holaday as the special assistant for guided missiles and this program was placed under his cognizance, so this recommendation was made directly to Mr. Holaday.

Mr. VANCE. When?

Dr. HAGEN. Approximately the 15th of July of this year.

Mr. VANCE. What happened on that recommendation?

Dr. HAGEN. Mr. Holaday investigated the recommendation, and soon agreed that it was a wise move for us to make, and so we immediately proceeded. Our actions, I think probably started around the first of August.

Mr. VANCE. And your recommendations were fully carried out in this later aspect?

Dr. HAGEN. Yes; we have fully carried out this recommendation.

MILITARY BENEFITS

Mr. VANCE. Now so far we have talked about the scientific advantages of the satellite. Could you tell us something about the military benefits to be gained from a satellite?

Dr. HAGEN. Yes. I think that to discuss fully the military advantages one would have to have a closed meeting, but I think it should be pointed out that the defense of this country in the technological age in which we live benefits from every scientific and every engineering

advance, and it is therefore to the advantage of the Department of Defense to carry forward work like this even though there may be no immediate military justification of the program.

Mr. VANCE. You feel you could go no further in open session?

Dr. HAGEN. I could only mention a few things that are of obvious advantage. One is that satellites, close-in satellites, can certainly be excellent aids to navigation. Within the Navy we have this navigation problem. The problem is not confined of course to the Navy but we are very aware of it. Close-in satellites can help in navigation. They could also help in such things as television relays.

Mr. VANCE. What are they?

Dr. HAGEN. You can place a satellite in an orbit some 22,000 miles or so above the earth, at which time it has a period of just 1 day. So you could place it over the United States, for example, and if you instrumented it as a television relay station, you could feed television programs into the satellite and have them rebroadcast to cover the whole of the United States with one transmitter. This is an obvious thing which will be done some day and it certainly has its military advantages.

Another thing that is of extreme interest to the military is one that I referred to earlier. It is of extreme importance to understand the conditions that exist several hundred miles above the surface of the earth, because certainly it is through these regions that not only instruments in our missiles but, later, men are going to travel, and you must understand the conditions before you can safely do this.

Mr. VANCE. Are there any further comments you wish to make?

Dr. HAGEN. I think that is as far as I should go.

RUSSIAN SATELLITES

Mr. VANCE. With respect to the Russian satellites I would like to find out how much we know about them.

First of all, how much have the Russians told us?

Dr. HAGEN. The Russians have told us very little in a direct fashion about their satellites. I think the most direct information we have was given at a meeting here in Washington in September, at which time we were told of their plan to put a spherical object in an orbit. It was well described, that is, it was described as 23 inches in diameter and weighing 184 pounds. We were not, of course, told at that time anything about their dates.

Mr. VANCE. Were the Russian satellites a part of their IGY effort?

Dr. HAGEN. The first report on the first satellite was, no, that it was a test sphere, but later this was withdrawn and now I think they have named both of their satellites as a part of the IGY.

Mr. VANCE. Then have they submitted any scientific information?

Dr. HAGEN. No; no scientific information, to my knowledge, has been submitted. The proper channel for that, is to submit this information to the international IGY organization in Brussels. All of the adhering nations have agreed to do this. But I should point out that there is no time limit on this agreement. This is understandable, because it takes different amounts of time to reduce different kinds of data.

The only thing we can say here is that we must wait and see whether the Russians do report the scientific results that they have obtained.

Mr. VANCE. What should the Russians tell us under the IGY agreement?

Dr. HAGEN. Under the IGY agreement, they should tell us what the experiments were, they should tell us what the results were, and show us the data. They should describe the vehicle, that is, the satellite itself, in which the experiments were located. But they are not required, under the agreement, nor are we, to describe the launching vehicle.

Mr. VANCE. Did they tell us within the required time that they had launched Sputniks I and II?

Dr. HAGEN. So far as I can determine, I think they did. Their announcement was, seemed to have come within the time of the first orbit, and that was about, well, within 90-odd minutes.

Mr. VANCE. And the requirement is 2 hours?

Dr. HAGEN. The requirement is 2 hours.

Mr. VANCE. From our own observations of the Russian satellites, what have we learned?

Dr. HAGEN. We have learned quite a bit. There are two classes of experiments that can be done with a satellite. This I should have pointed out earlier in conjunction with our own program, and suppose I take a minute and do this.

One class of experiment deals only with observing the satellite, whether it be observed by radio or by optical means.

When a satellite is in an orbit around the earth, there are two things which keep that orbit from being a permanent orbit, and being held in a fixed plane in space.

First, there is the attraction of the earth's equatorial bulge. The earth is bigger at the Equator than it is at the poles. This bulge tends to pull the orbit over, and when you try to do that, instead of falling over it precesses or turns exactly as a gyroscope does. So by observing the rate at which orbits precess, you can learn something about the ratio of the polar and equatorial diameters of the earth, and there is a very important thing from both the military and civilian point of view.

The other kind of perturbation or change is that due to what is left of the atmosphere when you get out that far. I should point out that at that distance above the surface of the earth, the pressure is about the same as it is inside a well-evacuated radio tube. There is very, very little gas, but there still is enough so that there is a drag effect on the satellite. Now, by observing the rate at which the orbit decays, one can determine the density of the air at these great altitudes.

PERIGEE AND APOGEE

Mr. VANCE. Just a minute, Doctor. By "decay," what do you mean?

Dr. HAGEN. By "decay," I mean this: Remember, I said orbits were mostly elliptical. They come close to the earth. That is called perigee. And on the other side, called apogee, they might be a thousand miles away from the earth as you can see from the chart over here.

As the energy is taken out of the orbit by the drag of the atmosphere, the apogee descends, the orbits decay, or shrinks in size, and the satellite eventually comes into the denser atmosphere; if it is a light shell,

such as this one, it will burn up, just as the meteor does. So, by observing the rate at which that orbit changes, you can determine the density of the atmosphere.

TRACKING RUSSIAN SATELLITE

Well, now, coming back to your original question: The Russian satellite is available to us to make this kind of observation, and this we are doing. We have already arrived at conclusions about the density of the atmosphere from observations of the rate of decay of the orbit, and we have a confirmation of the shape of the earth.

This information is approximate only, because the Russians chose a very poor frequency for the observation of the satellite in orbit. They chose a low frequency which could be easily heard by amateur radio enthusiasts and anybody with a shortwave radio, but it does not lend itself to accurate tracking. We therefore have not had extremely accurate tracking of these satellites such as we hope to get with our own, and we therefore do not have the geodetic information that we might have had.

Mr. VANCE. By "geodetic information," what do you mean?

Dr. HAGEN. Information on the shape of the earth and the mapping of the surface of the earth.

Mr. VANCE. With respect to the first Soviet satellite which was launched on October 4—

Dr. HAGEN. Yes.

Mr. VANCE (continuing). Explain what you can about it, its orbit, configuration, and so forth.

Dr. HAGEN. That satellite was launched at approximately 5:30 in the afternoon of the 4th of October. After it was in orbit, the satellite was separated from the rocket casing, which was the last stage of the rocket. The casing is obviously much larger than the satellite. Very, very few people have seen that satellite, but I am sure many in this room have seen the rocket casing.

From the rate of drag on the casing, which depends upon the ratio of the mass of the object to its area or size, and from the relative rate of drag for the satellite itself, we can draw rough conclusions as to the dimensions of the casing. If we add to that the information that can be obtained from simply observing it in reflecting sunlight and estimating the size from its brightness, we can say that it was a fairly large rocket which pushed this satellite aloft.

The casing, however, being larger than the satellite, had its orbit destroyed earlier and, as it fell in closer to the earth, went faster and faster, and got ahead of the satellite. At the present time, it is down pretty low. I do not know the precise number, but it is on the order of 120 miles or so, and it will not be very long, it will be a matter of weeks, before that comes all the way into the atmosphere and disappears as a meteor.

Mr. VANCE. How about the nose cone and the satellite itself?

Dr. HAGEN. The nose cone, we have lost track of, to my knowledge. It has probably come into the atmosphere long before this. The satellite itself, being a compact, massive thing, will stay up for a much longer time. It will be next spring before that comes into the atmosphere, I am sure.

Mr. VANCE. What conclusions, if any, can you draw, with respect to their guidance system, from the projecting of the two satellites in orbit?

Dr. HAGEN. I cannot draw too many conclusions about guidance without making certain assumptions. If we were to assume that they were shooting for an exact circular orbit, then you can draw some conclusions. However, as I pointed out earlier, there are advantages to elliptical orbits. So, we can only assume that they built in sufficient excess velocity to get an elliptical orbit. Therefore, the only conclusions you can draw are that their guidance is good enough to do that, and that is something on the order, in terms of angle, of a degree or so. Whether it is, indeed, finer than that, there is no way of knowing.

Mr. VANCE. Now, with respect to the second sputnik, which was launched on November 2—

Dr. HAGEN. Yes.

Mr. VANCE (continuing). What can you tell us about that?

Dr. HAGEN. Well, as you all know, this was handled in a different fashion. There was no separation. The experiments, which they reported weighed some thousand pounds, were left intact in the nose of the vehicle, so that the second satellite is as bright as the casing of the first vehicle.

With this satellite, they did not achieve as nearly circular an orbit as they did in the first. It was lower in the sky, to begin with, although it had a greater apogee. The perigee figure, I think, was 140 miles, and the apogee more like 1,100 miles. The second rocket, then, has had its orbit modified more rapidly than the first.

In addition to the dog with which we are now all familiar, they did say they had other experiments there, experiments on solar ultraviolet and cosmic rays, bearing a marked similarity to the scientific program that we have planned.

The radio transmitters in both of these lasted for just a short time. In the first case, the radio transmitter died out in some 3 weeks. In the second case, it lasted for an even shorter time. I believe that it was about 7 days after the satellite was launched that the radio transmitter failed. It was on the 8th of November that it failed.

Mr. VANCE. How long will this stay up?

Dr. HAGEN. This one will stay up, I feel, for certainly another several weeks, and maybe a month or two.

Mr. VANCE. What conclusions, if any, can we draw with respect to guidance from Sputnik II?

Dr. HAGEN. No more, I think, than from Sputnik I. Again, it is a matter of knowing what their aim was in the beginning, and this we do not know.

Mr. VANCE. You mentioned accuracy within a degree. Would you amplify on that a little bit?

Dr. HAGEN. Yes. In our case, where we are designing from the beginning to put a satellite in an orbit, we have determined that if we have a guidance accuracy of about $1\frac{1}{2}^\circ$, that, with the velocity excess we have at hand, we will safely put the satellite in a useful orbit.

Looking at the orbit that they achieved, if we assume that they started along the same avenue, then they could have been satisfied with the same guidance accuracy, and this is, of course, a much looser

accuracy than is required for the kind of things that you are primarily interested in.

Mr. VANCE. The ICBM?

Dr. HAGEN. Yes.

Mr. VANCE. What sort of accuracy is required there?

Dr. HAGEN. I couldn't give you the exact number at this meeting.

Mr. VANCE. But it is less than a degree?

Dr. HAGEN. It certainly is much less than a degree.

Mr. VANCE. Now, can you tell us anything about the rocketry used to launch these two satellites?

Dr. HAGEN. Just based on certain assumptions. The only thing that I think I could tell you here is that there is every indication that they are well advanced in the area of propulsion; that the rockets that put both of these satellites in the air were probably similar. It looks very much to us as if they had attacked this part of their ICBM problem with vigor and, certainly, with all the resources at their command.

Mr. VANCE. Can we draw any conclusions with respect to the amount of thrust which is required to get this into orbit?

Dr. HAGEN. We can. But, again, I would not want to discuss the thrusts here. The thrusts are on the order of the thrust that you would require for an ICBM. Maybe, at this time, I should point out something here. We seem to be getting by with a small thrust, 27,000 pounds. This is because the rocket that we are using is designed specifically to put a satellite in an orbit. The rocketry that they are using is obviously not. The rocketry they are using comes out of their military programs.

JUPITER-C AND VANGUARD PROGRAM

Mr. VANCE. Dr. Hagen, on November 8, 1957, it was reported in the public press that Secretary McElroy had announced the Army would supplement the existing Vanguard program by launching earth satellites using the Jupiter-C rocket as the launching vehicle. What do you know about this?

Dr. HAGEN. Well, this program, as I understand it, was announced as a backup program for Project Vanguard. It was an attempt on the part of the Department to doubly insure that we were ready with our IGY commitments in March.

Mr. VANCE. What connection, if any, would you have with this Army satellite?

Dr. HAGEN. We have no connection with the missile aspect of the Army program. We do have an indirect connection in the science program. As I pointed out earlier, the second scientific experiment, the cosmic-ray experiment, is now being put into the Army program, and we are also supplying some of the instrumentation that will go into the satellite the Army will use.

Mr. VANCE. You will work with the Army on that?

Dr. HAGEN. In this way; in the field of the scientific instrumentation.

Mr. VANCE. Is that the extent of the cooperation you will give?

Dr. HAGEN. At the present writing, we are not involved with them on rocketry.

Mr. VANCE. Just what is the relationship of the two programs? Are they independent, or are they supplementary?

Dr. HAGEN. They are being coordinated by Mr. Holaday's office, and the intent here is to take the device which the Army has and bring it along in time to make a true backup to the Vanguard for the March commitment.

Mr. VANCE. Do we have any information with respect to launching schedules of the Army satellite?

Dr. HAGEN. No, sir. I do not have any official dates on their schedule.

Mr. VANCE. Is there any other comment you would like to make, Dr. Hagen, on anything which I have not asked you?

Dr. HAGEN. No, sir. I think we have gone pretty much down the road.

Oh, yes; there is one other point I should make, which is in the area of cooperation. It is clear now that all of the United States satellites will be tracked by the Vanguard minitrack system. The Army satellite will have in it instrumentation and a radio transmitter which is compatible with our system so that we can do the tracking.

Mr. VANCE. Mr. Chairman, I have no further questions.

Senator JOHNSON. Mr. Weisl, do you have any questions you would like to ask?

Mr. WEISL. No, sir.

RUSSIAN SATELLITE AND IGY

Senator JOHNSON. Dr. Hagen, from a psychological and political standpoint, would it not have been of the highest importance to our own position in the world to put a satellite in orbit ahead of the Russians?

Dr. HAGEN. That is my personal opinion. I certainly believe so; yes.

Senator JOHNSON. From the political standpoint, from the scientific standpoint, from the psychological standpoint, we have suffered as a result of their launching the two sputniks ahead of us?

Dr. HAGEN. In most of those areas; yes. I am not so sure about the scientific standpoint. I think that the point here is that one should wait until the end of the IGY, and then take stock and see whether the program that this country has set out has produced scientific information of value that is comparable with, better than, or worse than that the Russians have.

Senator JOHNSON. When did the Russians tell us that they would launch a 184-pound satellite?

Dr. HAGEN. The first time that the Russians told us that their satellite would weigh 184 pounds was at the meetings of the National Academy in September of this year. They did not, however, tell us when the launching would be.

Senator JOHNSON. But they did tell us in September this year that they were going to launch a 184-pound satellite?

Dr. HAGEN. Yes, sir.

Senator JOHNSON. When did we inform the public?

Dr. HAGEN. Of this fact?

Senator JOHNSON. Yes.

Dr. HAGEN. On that same day. There were newspaper reporters in the room at the time.

Senator JOHNSON. And the press carried the Russian notification to us?

Dr. HAGEN. Oh, yes, sir.

Senator JOHNSON. What date was that?

Dr. HAGEN. This was some day around the 20th of September. I am not sure of the exact date.

Senator JOHNSON. Would it be possible to launch a satellite of greater weight than the Vanguard satellite with the Vanguard launching equipment, and would there be any scientific advantage in doing so?

Dr. HAGEN. With an improvement in the third stage engine, which we now know how to make, yes, it would be possible to launch a satellite of greater weight, and it would certainly be of advantage to us to do so. We would be able to do more things with it than we can with our present satellite.

Senator JOHNSON. I think you stated the Vanguard program was wholly a scientific program, and was given no priority. Is this the customary method followed by the Department of Defense in carrying out basic scientific research?

Dr. HAGEN. I think in the main, yes, although I must admit I am not aware of the priority of all the programs in Defense.

Senator JOHNSON. Russia is a member of the IGY, I believe you testified.

Dr. HAGEN. Yes, sir.

Senator JOHNSON. And each member was required by agreement to inform the others of the launching of a satellite.

Dr. HAGEN. That is correct.

Senator JOHNSON. And Russia did this.

Dr. HAGEN. Yes, sir.

Senator JOHNSON. You feel she complied with her agreement in toto concerning revealing scientific information as she was required to do by the agreement?

Dr. HAGEN. I think we will have to wait and see before we can answer that question. Remember, there was no time limit placed upon the supplying of information about the scientific experiments. It can be said that she has not been as cooperative in that way as this country has been, but legally, I think she may well be still within her rights.

Senator JOHNSON. Viewing this whole thing in retrospect now, you think we took a calculated risk and we lost?

Dr. HAGEN. I think that is a fair statement; yes.

Senator JOHNSON. Thank you, Doctor.

Senator Bridges?

DIFFERENCE BETWEEN ARMY AND NAVY ROCKET

Senator Saltonstall?

Senator SALTONSTALL. Thank you, Mr. Chairman.

Dr. Hagen, if I as a layman might ask you several questions that are difficult for me to express: One thing I did not understand from listening to you, why did your experiment start out with a different form of rocketry than the Army?

In other words, if the Russians were using their military rocketry, and were getting satisfactory results, why did we use a less effective smaller form of rocketry?

Dr. HAGEN. I think the answer to that is this: That you have to look back to the summer of 1955, because it was at that time that the problem was put, and at that time we did not have proven military rockets of the IRBM type that were available for this purpose. Of the various rockets that were available, each of the services had an opportunity to make a recommendation to a committee which was established by the Department of Defense, and which studied the problem.

The Committee decided that of all of the proposals made, the proposal made by the Navy stood the greatest chance of giving the scientists the kind of vehicle that they needed to do their scientific work.

Senator SALTONSTALL. Then it was not lack of coordination between the services, but a determination at that time that this Navy rocket was the best one for this purpose?

Dr. HAGEN. Yes, sir; that is exactly right.

Senator SALTONSTALL. I would like to ask this question—Mr. Chairman, I yield to you for a moment.

PRESIDENT EISENHOWER'S ILLNESS

Senator JOHNSON. The committee has just been informed by a press bulletin that President Eisenhower has suffered another form of heart attack. This bulletin states:

Judging from a statement issued by the White House the President could be described as the victim of a cerebral attack, but the White House physician, Maj. Gen. Howard Snyder, relayed word to reporters that the President, in his judgment, had not suffered a cerebral hemorrhage.

Of course this is very distressing news to all of us, I know that each member of the committee feels as I do, that we hope that he is not seriously ill. The President has our prayers for an early and I hope complete recovery.

Thank you, Senator Saltonstall.

We will go on with the hearing.

WEIGHT AND THRUST—UNITED STATES AND RUSSIAN

Senator SALTONSTALL. Thank you, Mr. Chairman. You express my feelings.

Dr. Hagen, do you believe that the Russians have gained anything in the development of an ICBM or an IRBM by launching their satellite, particularly with respect to the reentry problem?

You talked about guidance and you talked about rocketry.

Now as I understand it, the other two points, if you want to make them, are accuracy and getting it back through the atmosphere, I am asking you now about the atmosphere.

Dr. HAGEN. Well, it is not clear to me that they stand to learn anything concerning reentry through the satellite experiment. They made no attempt to recover that dog, for example.

Senator SALTONSTALL. Now, I would like to know the weights. As I understand it, the weight of your proposed satellite is 21½ pounds?

Dr. HAGEN Yes, sir.

Mr. VANCE. And the Russian's first satellite was 184 pounds?

Dr. HAGEN. That is correct.

Mr. VANCE. And the second one was what?

Dr. HAGEN. It was nearer—well they did not make it clear what the exact weight was. They did say that there were approximately a thousand pounds of equipment up in the nose of the rocket.

Senator SALTONSTALL. Was our weight at 21½ pounds chosen because of the amount of rocketry that we had?

Dr. HAGEN. In a way, yes. It was chosen as the best compromise that could be made between the kind of rocketry that we had to start with, and the time element with which we were dealing, and the magnitude of the experiment that the country wanted to get into.

Senator SALTONSTALL. Yes. So there is no military significance of any great weight in the fact that they have shot up a satellite that is much heavier than ours?

Dr. HAGEN. It does not reflect upon our ability in military rocketry. There is a military significance in that it shows that they have capabilities with these big rockets.

Senator SALTONSTALL. In other words, what we do know is that they have the thrust power?

Dr. HAGEN. Yes, sir.

Senator SALTONSTALL. Which is so important?

Dr. HAGEN. Yes, sir. This is correct, yes.

Senator SALTONSTALL. And by using our Army rocketry do you believe that we have an equivalent thrust power?

Dr. HAGEN. Now, sir, I would like to understand you exactly, do you mean by our Army, the Jupiter-C?

Senator SALTONSTALL. Well, is it the one that you are using?

Dr. HAGEN. The one that we are using is based on the Viking rocket. It has a thrust of some 27,000 pounds and is a finely designed rocket.

Senator STENNIS. Will you suspend until we get order here? We actually cannot hear the witness and actually have not been able to.

Senator JOHNSON. I am sorry, I did not know that.

The disturbance comes from the television cameras.

Senator STENNIS. You can't realize that. I just cannot hear the witness.

Senator JOHNSON. Could I appeal to the technicians on my right to cooperate with us during our consideration of the witness' testimony?

I have had other Senators speak to me about it.

We want to be as cooperative as possible, but the first purpose of the inquiry is for the Senators to get information. If they cannot hear the witness because of either work being done or private conversation, we will have to take steps to insure that they can hear the witness.

Senator Stennis, I beg your pardon, I am sorry I did not know about it. I hope you won't be so patient next time. If you will call it to my attention, we will either clear up the noise or clear out the cameras.

Proceed, Mr. Saltonstall.

Senator SALTONSTALL. Mr. Chairman, may I repeat my question, and I have lost track of time but I have two questions.

Senator JOHNSON. Senator, you proceed in your own discretion.

Senator SALTONSTALL. Thank you. Mr. Weisl has just told me that you could put, as I understood him, 2 or 3 of these rockets in together and that would give you a much greater thrust.

Dr. HAGEN. Yes, sir.

Senator SALTONSTALL. So the fact that the Russians have this thrust, is not significant beyond the fact that we know they have it.

They haven't any thrust that is particularly greater than ours, in your opinion?

Dr. HAGEN. It is very hard to come back with a very clear and concise answer to that. It is clear, I think that the Russians have large propulsive power. They have that power, and they have been using it.

The point is, or the point I was making, is that we were comparing potatoes and peas here when we compare with they are doing with our Vanguard experiment, because our rocketry for this is not a military rocket, and we should not draw conclusions about our military capabilities in this comparison. I think that you have to go outside to do that.

SATELLITE-GUIDANCE ACCURACY

Senator SALTONSTALL. Well, thank you.

Just one more question.

Mr. Vance asked you this question in a little different form but it is not clear in my mind. I read in the newspaper, for instance, that some scientist was quoted as saying that the Russians' ability to shoot this satellite into its orbit indicated a guidance accuracy of 5° , as I understood the article.

Now you say that this was about a degree, and then you say what we are interested in in ballistic missiles, I think I quote you correctly as saying, that it is less than a degree?

Dr. HAGEN. Yes, sir.

Senator SALTONSTALL. Could you describe a little more accurately, perhaps with your chart, what you mean by that, because it is not clear to me at all?

Dr. HAGEN. I don't know that I have a chart here that shows that particular thing, but maybe I can do it with gestures.

The angle that you are worried about is the pitch angle in the rocket. If you have lots of excess velocity, maybe it would be 2,000 feet per second, something on that order, then you can afford to make an error of 5° in this pitch angle and still have an acceptable orbit. However, your excess velocity is lower than that, and in their first rocket it was—it was only 600 feet per second—then the allowable error is about 1° in round numbers.

For a ballistic missile, however, where you are aiming at something thousands of miles away, and you must hit it within a mile or so, then the allowable error is an order of magnitude smaller than that.

Senator SALTONSTALL. In other words, your only interest in a satellite is to have a sufficient speed with whatever margin of error in guidance you needed to keep it in its orbit?

Dr. HAGEN. Yes, sir; exactly.

Senator SALTONSTALL. With a ballistic missile, you have got to have it much more accurate because it has got to come up and down again at a certain point?

Dr. HAGEN. Yes, sir, and hit a target.

Senator SALTONSTALL. And hit a target?

Dr. HAGEN. Yes, sir.

Senator SALTONSTALL. So the guidance on that must be much more accurate?

Dr. HAGEN. Much finer.

Senator SALTONSTALL. Have we any evidence from this satellite of the guidance that the Russians may have?

Dr. HAGEN. No, sir; not in that context. The only thing we can do is draw very, very general conclusions and say that it was at least as good as about 1°, and that is interesting to the satellite problem, but it is not interesting to the other.

Senator SALTONSTALL. Thank you, Mr. Chairman.

Thank you, Dr. Hagen.

Senator JOHNSON. Senator Bridges was detained by a phone call when his time came for questioning.

I wonder if he has any questions.

Senator BRIDGES. No question, Mr. Chairman.

Senator JOHNSON. Senator Byrd?

Senator BYRD. Thank you very much, Mr. Chairman.

Senator JOHNSON. Senator Kefauver?

NUMBER OF SCHEDULE CHANGES

Senator KEFAUVER. Thank you, Mr. Chairman.

Dr. Hagen, how many times have we revised our schedule for the launching of this satellite?

In other words, in June of 1957, did you not somewhere say that it would be launched in October of this year, and in October you revised it to March, and now you have a smaller one and—or is this the small one that is revised in March?

Dr. HAGEN. No, this is the smaller one, and it is scheduled to go in December. Now as to the number of times that we have changed the schedule, I might say that it has been a good many times. We periodically review the status of the work and have tried to keep our plans for launching consistent with the status of the work.

At the very beginning of the project, at the time when the specifications were first definitively laid out, which was in March of 1956, we projected the date of October 1957. And this date has changed several times, I don't recall the exact number of times, in the interim. We do report these dates in a classified manner to the Department in our monthly reports.

Senator KEFAUVER. Wasn't it your Captain Metsger who said in June that you expected to launch it in October?

Dr. HAGEN. In June of 1957—

Senator KEFAUVER. June of 1957.

Dr. HAGEN. I am sorry, I don't recall, and I should have seen that testimony, the exact wording there, but at that time, I am not sure. I would have to have the record in front of me of our scheduling to know whether by that time we had changed the planned date for the first launching from October.

My recollection is that we had.

Senator KEFAUVER. Well, June 3, 1957, you were present when Captain Metsger said that?

Dr. HAGEN. Yes.

Senator KEFAUVER. It will be the first artificial satellite.

Was that your thinking at that time?

Dr. HAGEN. This is the point that I was making. I am not sure of the dates of the actual changes in our schedule. I would have to look at the records to make sure. It seems a bit late for that date.

Senator KEFAUVER. Well, this is the hearing of June 3, 1957, before the Appropriations Subcommittee.

Did you not have information that the Soviet were about to launch their satellite?

Dr. HAGEN. No, sir. I have never had information, and certainly not at that time, that the launching of the Soviet satellite was in any way imminent.

Senator KEFAUVER. Well, sir, you reportedly said at the Press Club on October 11 that the satellite could have gone up earlier but then it was a question of who made the decision against giving Vanguard a priority status.

Your answer in a very general way, the Department of Defense.

What did you mean by that, that—will you explain that?

Dr. HAGEN. Yes.

We, being a part of the Department of Defense, received our directions from the Department of Defense.

The enabling letter which started us on our way and cited the priorities under which we would operate came from the Deputy Secretary of Defense.

Senator KEFAUVER. Who was that?

Dr. HAGEN. Mr. Robertson at that time.

Senator KEFAUVER. Well, then, these decisions did cut back the priority of the satellite so that you could have launched it—

Dr. HAGEN. It did not cut it back. It just was never set up that high to begin with. It never was at a high level. It started out at a level which would not interfere with a higher priority ballistic missile project.

Senator KEFAUVER. If it had a higher priority could you have had it in orbit in 6 months or a year before the sputnik?

Dr. HAGEN. I would not want to say precisely how much sooner, but I would want to say that had we in the beginning been given the priority and the things that go with priority, which are men, materials, funds—had we had those in the beginning, we would certainly have improved the dates that we presently have, and I think we certainly would have been ahead of the Russians.

FUNDS

Senator KEFAUVER. Well, Congress has given you all the money you asked for in this field, for this program.

Dr. HAGEN. I think this is—

Senator KEFAUVER. You asked for 35—

Dr. HAGEN. That is certainly correct, yes.

Senator KEFAUVER. You asked for \$35 million and then withdrew the request; did you not?

Dr. HAGEN. No. We did not really withdraw the request.

This program was funded in the beginning out of the Secretary's emergency fund. There never was a price tag on the project per se.

The procedure was that we would go to the Department with a budget for our operations and make a request for funds for the remainder of that particular year, and some months, it would be 2 or 3 months after the request, the funds would be forthcoming.

This kind of financing went on until, I think it was June, July, and August of this year, when we came before the Congress, the Chief of Naval Research, Admiral Bennett, presented the budget to completion for the project, and this is when that 34.2 figure came up.

Senator KEFAUVER. The point is you got all the money of Congress that you requested?

Dr. HAGEN. Yes, sir, I think this is right.

DOD SATELLITE COMMITTEE

Senator KEFAUVER. Just one more question, Mr. Chairman.

You referred to a committee established in the Defense Department to decide which of the services would perfect the rocketry of the satellite and it was given to the Navy finally.

How long did that committee consider the matter before it rendered a decision?

Dr. HAGEN. I cannot tell you precisely, but it was on the order of 2 months.

Senator KEFAUVER. Wasn't it longer than that? Didn't it have one chairman who withdrew, then another chairman who—

Dr. HAGEN. Well, I was not a part of the whole of the proceedings of that committee, so I do not believe that I am in a position to tell you exactly. I believe that the length of time that committee was considering the problem was on the order of 2 months but I do not know that in detail.

Senator KEFAUVER. Was it the committee of which Mr. Quarles was finally the Chairman?

Dr. HAGEN. No, sir, this was the Committee on Special Capabilities which reported to Mr. Quarles at that time.

Senator KEFAUVER. Was there another committee in addition to that one?

Dr. HAGEN. I am sure there were other committees within the Department. I think, I am not sure, though, of which committee you are referring to.

Senator KEAVER. I was referring, sir, to the committee to make a decision not to give the rocketry to the Army or to the Air Force but to the Navy.

Dr. HAGEN. The Committee on Special Capabilities does not in this sense decide, they recommend. And this recommendation was made to the Department of Defense, and as I recall it at that time, the man who sat in the position to which the recommendation would be made was Mr. Quarles. And the Department of Defense made the decision, based on the recommendation of the Committee on Special Capabilities.

Senator KEFAUVER. All right, thank you, Doctor.

Senator JOHNSON. Is that all the questions you have, Senator Kefauver?

Senator KEFAUVER. Yes.

Senator JOHNSON. Thank you very much, Senator.

Senator Flanders, any questions?

SATELLITE GUIDANCE

SENATOR FLANDERS. Sir, I had to go out once or twice and I did not get the significance of this December 3 device which you have on your desk.

Is it expected to put that in more or less self-sustaining orbit?

Dr. HAGEN. Yes, sir.

It will be on a test vehicle, and if that vehicle functions properly this will go in a self-sustaining orbit.

Senator FLANDERS. The orbit will be approximately of as long a life as you would expect from a later device?

Dr. HAGEN. Not quite as long. Because the area mass ratio is different, it might not last as long. However, there is an interesting thing about this which I did not point out before, and that is that these things up here are solar cells so if this stays in an orbit for several months it will continue to radiate all that while.

Senator FLANDERS. That device is not provided for the larger one?

Dr. HAGEN. At the present writing, it is not.

Senator FLANDERS. Yes.

Now, you have been speaking about guidance. I take it that for the satellite the guidance is in the vertical plane, primarily?

Dr. HAGEN. I laid emphasis on the vertical plane because that is the critical thing.

As a matter of fact, however, there is guidance along all three axes, in roll, pitch, and yaw. If you made a mark with a piece of chalk on the vehicle on the ground before it was launched you can say that mark will be on top when it gets through its orbit.

Senator FLANDERS. Well, now, just for the fun of it, I carry my date book in my pocket which is a General Electric date book.

Dr. HAGEN. Yes, sir.

Senator FLANDERS. And I figured out what a degree means at a thousand miles.

I take it that at a thousand miles a minute gives 1,540 feet of error, and at 3,000 miles it gives pretty nearly a mile of error.

So 1/60th of a degree gets to be of importance in the intercontinental thing?

Dr. HAGEN. Yes, sir; that is correct. That is the arithmetic.

Senator FLANDERS. You mentioned—you used the word once in a while—the engine. Is this anything more than a simple rocket?

Is there any other mechanism involved?

Dr. HAGEN. No. Well, there are many other mechanisms in the rocket.

Senator FLANDERS. Yes. The propulsion?

Dr. HAGEN. The propulsion is a straightforward liquid rocket in the first two stages, and a solid propellant rocket in the third stage.

Senator FLANDERS. What is that little thing on the tail of rocket No. 1?

Dr. HAGEN. Oh, that is the nozzle of the engine, and you know this rocket had no fins.

Senator FLANDERS. Yes.

Dr. HAGEN. This is one of the developments that came out of the Viking program.

We found we could steer the rocket by moving the engine back and forth much as you would balance a broom on your finger.

JUPITER VERSUS THOR

Senator FLANDERS. Yes.

Well, that is interesting.

Now was not Jupiter in the further stage of development than the rocket you are presently using and, if so, why didn't you use Jupiter?

Dr. HAGEN. To which Jupiter are you referring, sir?

Senator FLANDERS. Well, the only Jupiter I know of is the one that has supposedly had some fairly successful trials down at Canaveral.

Dr. HAGEN. Well, the reason I asked the question is because there is a Jupiter per se, and a Jupiter-C, and I wondered, are you thinking of the IRBM Jupiter?

Senator FLANDERS. Yes.

Dr. HAGEN. The IRBM Jupiter, to the best of my knowledge, was not available in the summer of 1955 to the extent that one would have felt safe in using it for this purpose. We now know that if we should take either of the IRBM's, the Jupiter or the Thor, and put some of these Vanguard components on them, we could put much larger things in good orbits.

Senator FLANDERS. However, are you willing to say that there was no shift from your present Vanguard proposal to one of the IRBM's indicated, that no such shift would have improved the final launching of a successful missile?

Dr. HAGEN. It is touch and go. I think that this is almost correct, that you have to make certain assumptions about what kind of priorities you have to get the right to take these things when you want them. But assuming that, for the argument that you had all of the priority in the world, I think you just about break even.

Senator FLANDERS. Yes. Well, I felt that it was important to hear you say that.

Dr. HAGEN. Yes, sir.

Senator FLANDERS. Because that subject has been under considerable discussion.

Dr. HAGEN. Yes.

ELLIPTICAL VERSUS CIRCULAR

Senator FLANDERS. Just one other thing about the orbits.

Is it easier to get an elliptical orbit than it is to get a circular one?

Dr. HAGEN. Yes, sir. The circular orbit is just a special case of the elliptical.

Senator FLANDERS. I see.

Dr. HAGEN. If you hit everything exactly right you can make a circle.

Senator FLANDERS. But you really were stating your purpose when you said there were advantages to the elliptical orbit that did not inhere in the circular orbit?

Dr. HAGEN. That is quite correct; yes, sir.

Senator FLANDERS. And because of the apogee, you can get one set of observations and at the perigee the other?

I am trying to remember how I saw those two words spelled in that press release but they were funny. I am through, Mr. Chairman.

Senator JOHNSON. Thank you, Senator Flanders.

Senator Stennis?

REENTRY NOSE CONE

Senator STENNIS. Dr. Hagen, I wanted to ask you about this cone the President showed in his address on the television.

You will recall that he said it had been beyond the atmosphere, and had returned. Well, if you have personal knowledge of that, would you enlarge on it some and give us the significance of it?

Dr. HAGEN. Well, sir, I have very little personal knowledge of that, only what I—the only thing I can say is what I read in the newspapers, and my knowledge really is limited almost to that.

That was a nose cone out of a test for the reentry problem. It had been sent up on a missile and came back down into the atmosphere at some supersonic speed, and——

Senator STENNIS. Without being destroyed?

Dr. HAGEN. Without being burned up, yes.

Senator STENNIS. Well, was that in itself a sufficient demonstration there to establish this superproblem of reentry, as the witnesses described it yesterday?

Dr. HAGEN. I am not really—I think I am beginning to get to the point where I am not competent to discuss this, because I don't know the details.

SPUTNIK I AND II

Senator STENNIS. By the way, this sputnik that could be seen from the ground here Sunday evening in Washington——

Dr. HAGEN. Yes.

Senator STENNIS (continuing). Which one was that, and was that the cone or the rocket casing, or what?

Dr. HAGEN. That was the casing of the first Soviet satellite. It can only be seen in twilight, and of course it is seen for a while and then you wait a few weeks and it comes back again. This is the second or third appearance of that. But it was of the first satellite.

Senator STENNIS. May I ask you if you saw it?

Dr. HAGEN. Yes, sir. I saw it the night before last on the way home from work.

Senator STENNIS. Well, I claim the distinction of having seen it myself, and I am very much impressed.

Dr. HAGEN. It is a very thrilling thing to see.

Senator STENNIS. Distinctly not a star or a plane or anything of that kind.

Dr. HAGEN. Right.

Senator STENNIS. You say that this second sputnik, you expect it to stay up, did you say, several weeks or several months?

Dr. HAGEN. Oh, I think it probably would be months.

Senator STENNIS. Months?

Dr. HAGEN. Months, yes. I cannot say how many, but several.

Senator STENNIS. If you commented on the weight of this second sputnik, I did not hear it.

Dr. HAGEN. No, sir; I did not give it.

Senator STENNIS. Would you comment on that? This 1,108 pounds, do you think that it does weigh that much? And, if so, what is the significance of being able to launch one that heavy?

Dr. HAGEN. Yes; I think there is every evidence that it weighs that much, and that was what was back of the statement I made

that what they have done so far with the satellites has indicated that they have worked with vim and vigor on their ICBM problem. The launcher is of that type.

Senator STENNIS. And that is the main threat, is it not, from Sputnik II; that is, what Sputnik II demonstrates?

Dr. HAGEN. It certainly is; yes.

Senator STENNIS. With this launching power, then, it is very reasonable to assume a corresponding development over in this other field; is that correct, now?

Dr. HAGEN. That is quite correct. You cannot tell from the satellite effort how far along they are with the other or how far in their tests and guidance and all of that, but nevertheless they have demonstrated that at least in these tests they have the propulsion.

Senator STENNIS. The disturbing news came here a while ago during your testimony, and I did not know just how far you went in giving a military appraisal to this Sputnik II.

Did you say that you would desire closed hearings on it to give that testimony?

Dr. HAGEN. I would prefer to talk about that in a closed hearing; yes, sir.

Senator STENNIS. Very well.

That is all I have, Mr. Chairman. Thank you.

Senator JOHNSON. Thank you, Senator Stennis.

Senator CASE?

Senator Smith?

Senator SMITH. I have no questions, Mr. Chairman.

Senator JOHNSON. Senator Symington?

Senator CASE?

RECOVERY OF NOSE CONE

Senator CASE. Mr. Chairman.

Dr. Hagen, was it an accident that this cone was recovered which the President showed in his broadcast, or was it anticipated that it would be recovered?

Dr. HAGEN. It was no accident. It was designed to be recovered, and there were elaborate precautions made to actually recover it.

Senator CASE. Then the fact of its recovery was, it was a successful effort?

Dr. HAGEN. I think in every way, yes.

Senator CASE. Are you free to say whether or not it was recovered where and when it was expected that it might be recovered?

Dr. HAGEN. Well, only—again, I didn't take part in that experiment. I do not know the dates. But let me say that this thing that you saw that was recovered—I think I detect something—this was never a satellite.

Senator CASE. I understand that, but it did represent a certain achievement if something can be sent as far as that was and then recovered—

Dr. HAGEN. Yes.

Senator CASE (continuing). At a point where it might be expected to be recovered.

Dr. HAGEN. Yes.

Senator CASE. And recovered more or less intact.

Dr. HAGEN. That is correct. It was an Army experiment. The Navy, however, did participate in the recovery, and they did have ships in the right area at the right time to pick the thing up.

Senator CASE. Now, it is implicit in what you just said that it was recovered at sea.

Dr. HAGEN. Oh, I thought that this was generally known.

Senator CASE. Well, I was just bringing this out to sharpen the point that the recovery at sea required an anticipation of where it might be recovered, and how it might be recovered, and that that effort was successful.

Dr. HAGEN. Yes.

Senator CASE. I was down at Canaveral the other day, and heard some further information about it, but what you have just said wholly corresponds with that.

But I was impressed by what I heard there, and by what you have said here, that the fact of the recovery required certain planning, and that that involved anticipation as to timing and conditions and method, and that that was all successfully done.

Dr. HAGEN. Yes, this is true.

Senator CASE. Are you free to translate the thrust or the propulsion that sent Sputnik II, with the weight that it had, to the height that it achieved, into terms of an ICBM?

Dr. HAGEN. These are the kinds of numbers that I would prefer to talk about in a closed session, and not in an open one. I am sorry.

Senator CASE. Thank you very much.

That is all, Mr. Chairman.

Senator JOHNSON. Senator Bush?

Senator BUSH. I have no questions, Mr. Chairman.

Senator JOHNSON. Senator Barrett?

Senator BARRETT. No questions, Mr. Chairman.

Senator JOHNSON. Senator Carroll?

SENSE OF URGENCY

Senator CARROLL. Dr. Hagen, as I recall that part of your testimony, you said that you personally had had a sense of urgency—

Dr. HAGEN. Yes, sir.

Senator CARROLL (continuing): About this program.

Dr. HAGEN. Yes, sir.

Senator CARROLL. Were the scientists connected with the Navy in close contact with scientists of the other military establishments, the Army and Air Force, in this matter, because of this sense of urgency?

Dr. HAGEN. Not every one of them, of course, but where the need arose I think the answer is "Yes."

Senator CARROLL. Did I understand correctly that in May of this year, due to the development of the engine of the third rocket, you abandoned the nose cone concept to the sphere that you have indicated, the missile?

Dr. HAGEN. The test was in May, but the decision to do this, based on the derived information from the test, did not come until July.

Senator CARROLL. It was July, then, that certain decisions were made?

Dr. HAGEN. Yes, sir.

RAND REPORT

Senator CARROLL. It has been brought to my attention that there was a 24-page report submitted by the RAND Corp., of Santa Monica, Calif. It was a report made to the Air Corps, June 21.

Dr. HAGEN. Yes, sir.

Senator CARROLL. This fits into the general period between May and July.

In that 24-page report, it indicates that the Soviet publications, scientific publications, I assume, indicate that the Russians were about to send forth a satellite.

So this article—and I am reading from the Washington News of November 22, 1957—contained a sketch of a dog harnessed for space flight. Were you aware of that RAND report?

Dr. HAGEN. No, sir.

Senator CARROLL. Was that ever called to your attention, as you cooperated with scientists of the other military establishments?

Dr. HAGEN. I don't believe it was.

Senator CARROLL. Did you know that the Russians were about to launch, according to this report, or, if you heard about the report or from other sources, they were about to launch their project in the latter part of September?

Dr. HAGEN. No, sir; I think the answer to that is "No."

Senator CARROLL. That is all.

CONCLUSION

Senator JOHNSON. Thank you, Senator Carroll.

Are there any further questions of counsel?

Any additional questions of any Senator?

Doctor, would you tell this committee of anything which you think needs to be done now to place this Nation in a more secure standpoint in relation to the Soviet Union?

Dr. HAGEN. In the area in which I am now working, I think that certainly, as I indicated before, there should be an organization and plans made to go further in the area of space investigation and space flight.

Senator JOHNSON. You would say that the present organization and the existence of plans at the present time in the area in which you are working are inadequate?

Dr. HAGEN. At the present time, I think it is; yes.

Senator JOHNSON. If you had the complete authority and responsibility, what changes would you make?

Dr. HAGEN. I think what is needed, and the precise location of the organization, is perhaps debatable; but what is needed is a single organization devoted to this type of work. Whether that organization would be better placed in the Department of Defense or whether it is better a separate agency is the question to which I do not have the answer, but I know it would work within the Department of Defense. There should be, however, this single agency into which policy decisions should be passed, and then both the authority and the responsibility for action would be given to the agency.

Senator JOHNSON. And I assume the necessary funds to carry it out?

Dr. HAGEN. Yes, sir; that goes with the authority.

Senator JOHNSON. Do you have any recommendations that you think you should make to this committee that you have not already made?

Dr. HAGEN. I believe I have pretty much covered what I had in mind when I came; yes, sir.

Senator JOHNSON. Are you familiar with the testimony taken yesterday by this committee?

Dr. HAGEN. Not in detail. I heard a bit of the testimony of Dr. Bush. But I did not hear or read, so far, Dr. Teller's.

Senator JOHNSON. Do you have any comment to make on Dr. Bush's recommendations?

Dr. HAGEN. What I heard, I was entirely in agreement with.

Senator JOHNSON. Dr. Hagen, the charts to which you referred in your testimony will be made a part of the record.

Dr. HAGEN. Thank you.

(The charts referred to appear on following pages.)

Senator JOHNSON. Dr. Hagen, the committee thanks you very much for your—

Senator STENNIS. Mr. Chairman, may I say just one additional word?

Senator JOHNSON. Senator Stennis.

Senator STENNIS. Dr. Hagen, I want to commend you for the very clear statement you have made about this one responsible authority in charge of the program, one who had the responsibility and the authority to act in the premises.

I have asked others that question. I did not ask you, because I thought you might be a little too intimately connected with it to want to give a flat opinion, but I think you have given a very clear one and a very valuable one.

May I add this additional point there, and see if you do not also include this: You set up this person with authority to correlate and get all the program together and run it. If it is going to be overruled by, say, the Secretary of Defense or the Bureau of the Budget, he still does not have the authority to move.

Now, will he not also have to have the authority which is right next to the President himself, to be exercising the President's authority directly, to overcome any impediment of that kind from whatever source, Budget Bureau or wherever?

Dr. HAGEN. Yes, sir; that is correct. You get into an area where I guess it is the sin of being big.

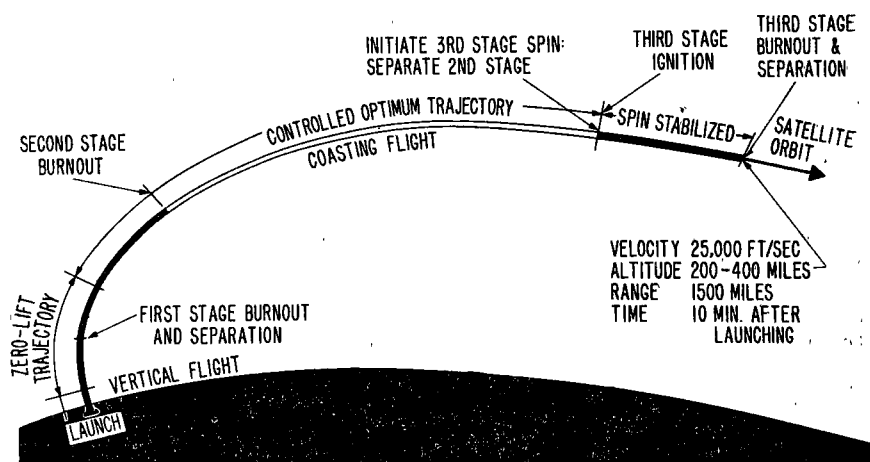
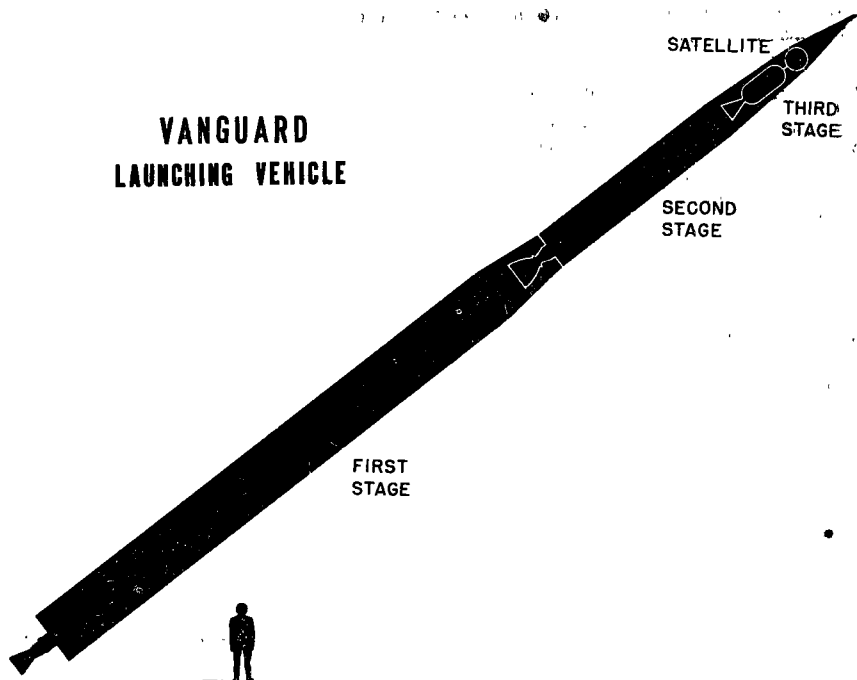
The clear delegation of authority does not always hold because of the simultaneous delegation of authority by the man above you to his staff, who can then second-guess on decisions.

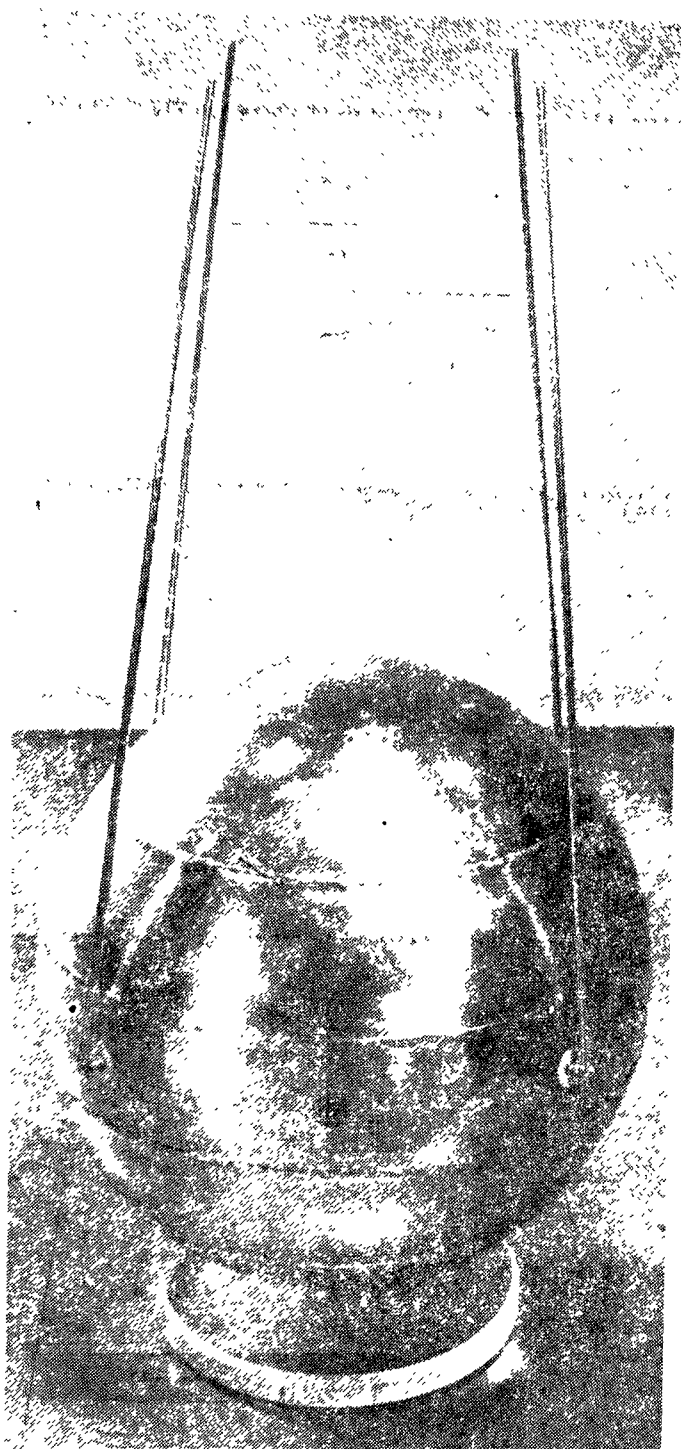
Senator STENNIS. But my point was to have the real authority that would make the programming, under all circumstances, it would have to be Presidential authority that this man holds and exercises subject only to the President himself.

Dr. HAGEN. It would certainly help to have that weight behind it; yes, sir.

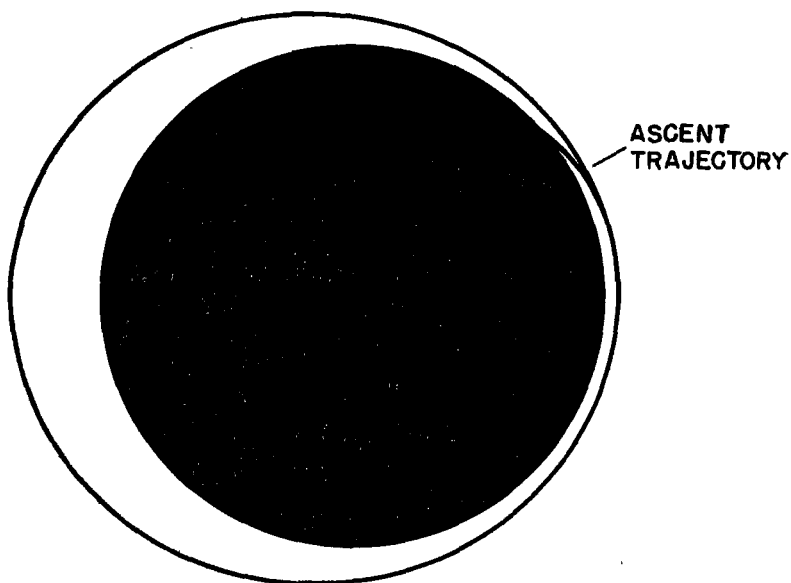
Senator STENNIS. Well, it is almost necessary; is it not?

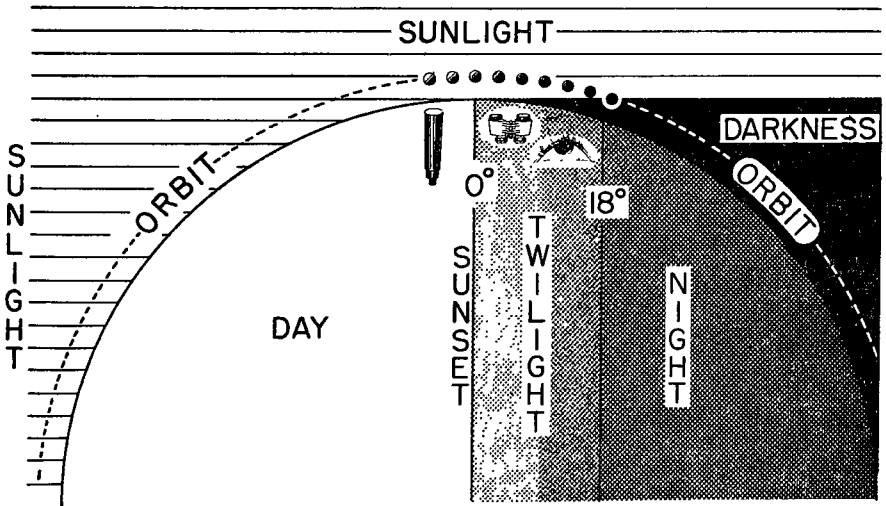
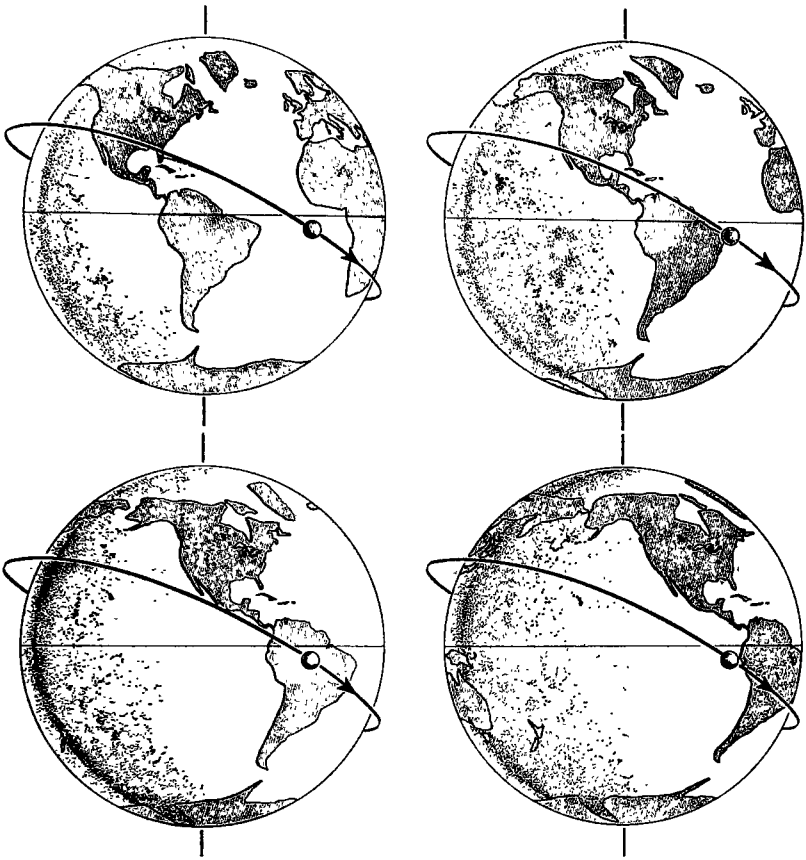
VANGUARD LAUNCHING VEHICLE



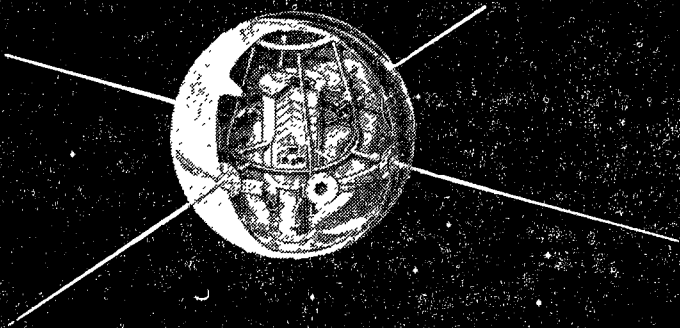


PLAN VIEW OF ORBIT WITH { 200 MILE PERIGEE
1400 MILE APOGEE





SCIENTIFIC EARTH SATELLITE



U. S. NAVAL RESEARCH LABORATORY

SOLAR ULTRAVIOLET
AND X-RAYS

SATELLITE

-250 MILES

ALTITUDE -

-120 MILES

-60

-35

-18

IONOSPHERE

EARTH'S SURFACE

SUNLIGHT
ABSORBED

REGION

ULTRAVIOLET

ULTRAVIOLET
AND X-RAYS

X-RAYS
ULTRAVIOLET

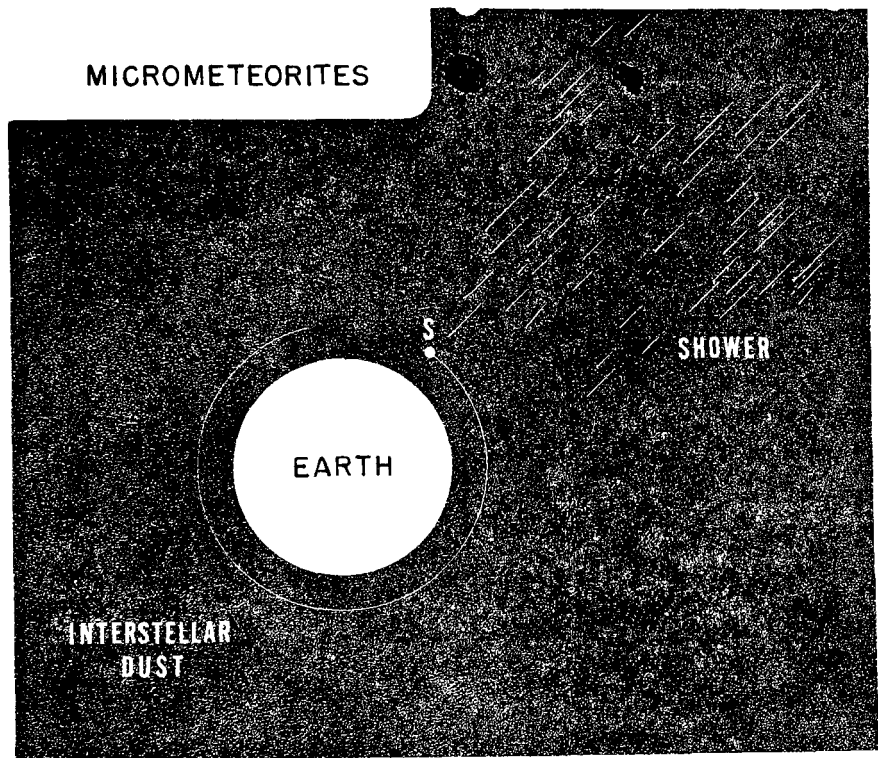
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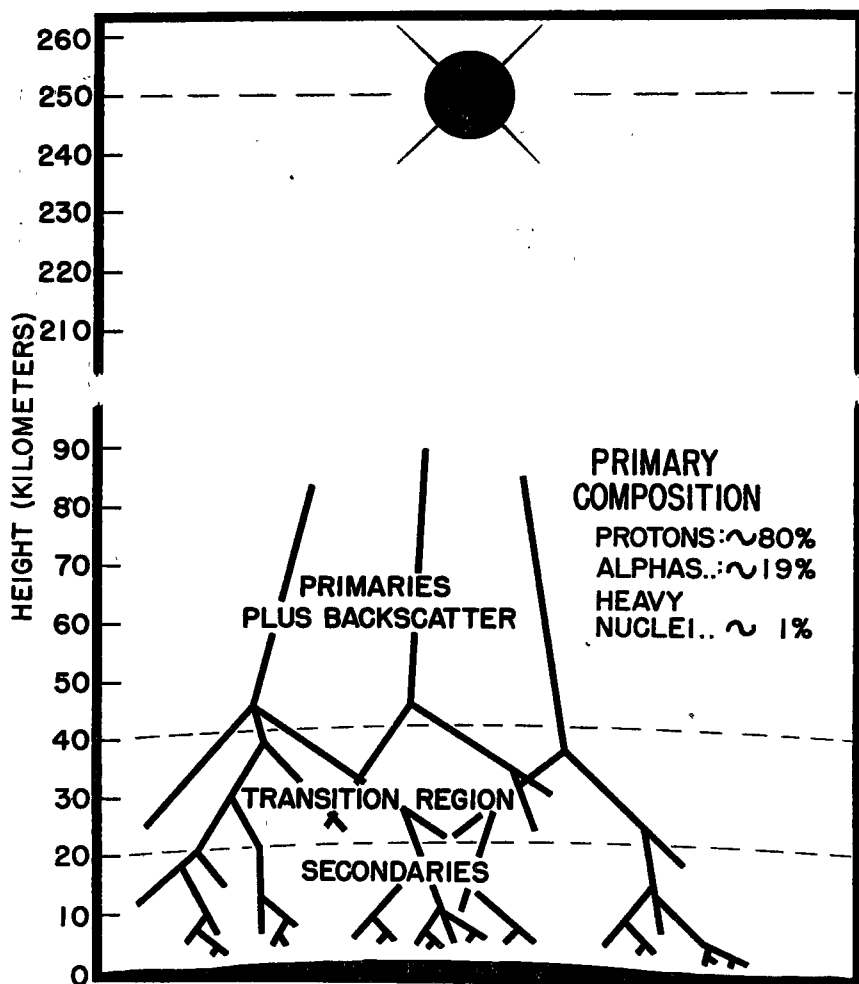
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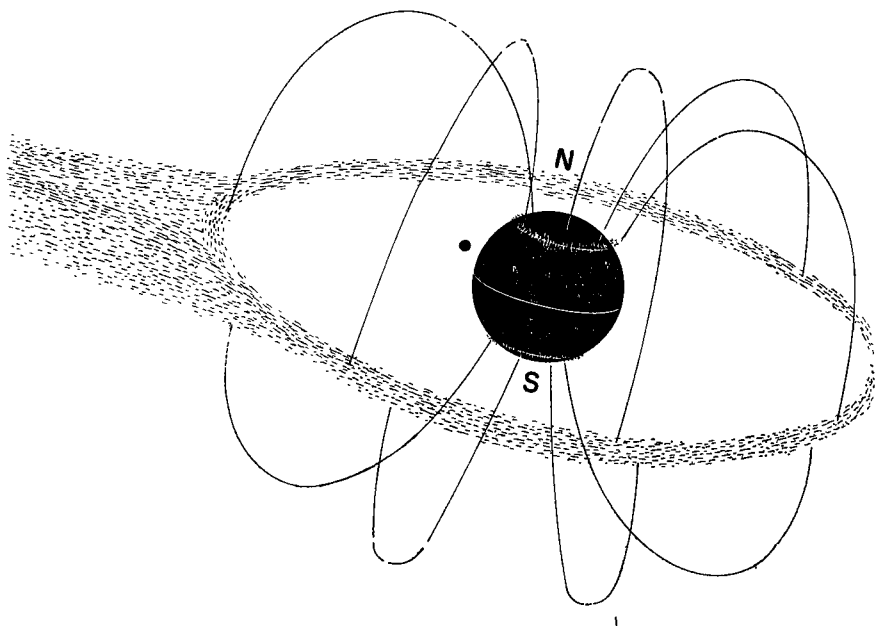
MICROMETEORITES



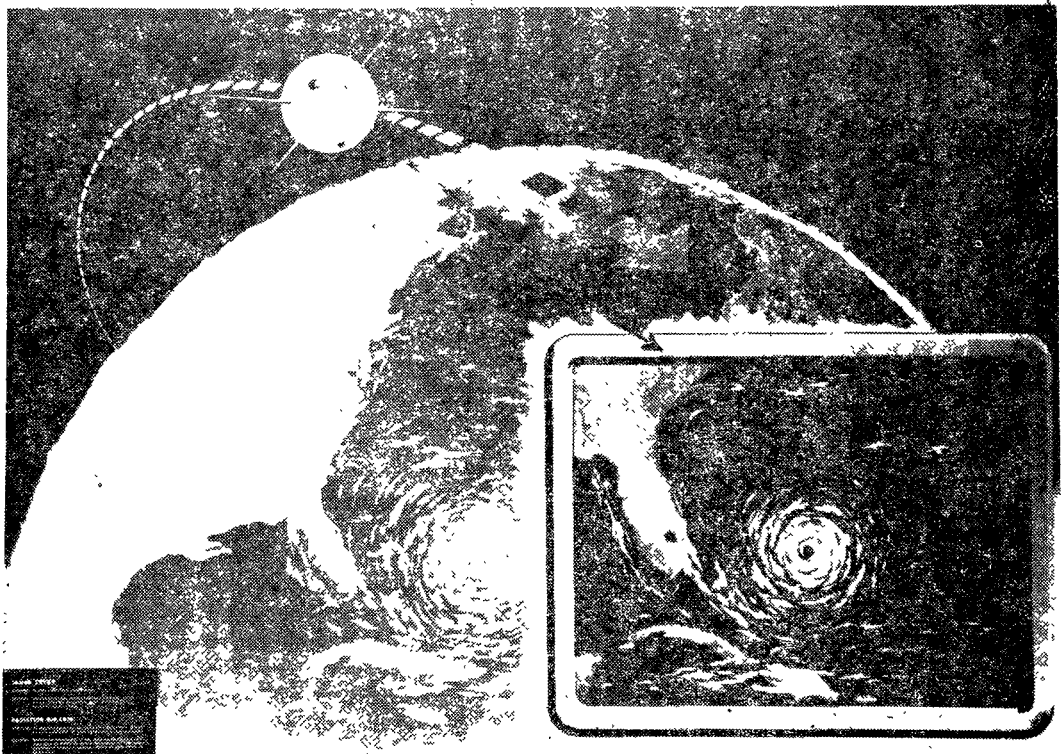
COSMIC RAY STUDIES



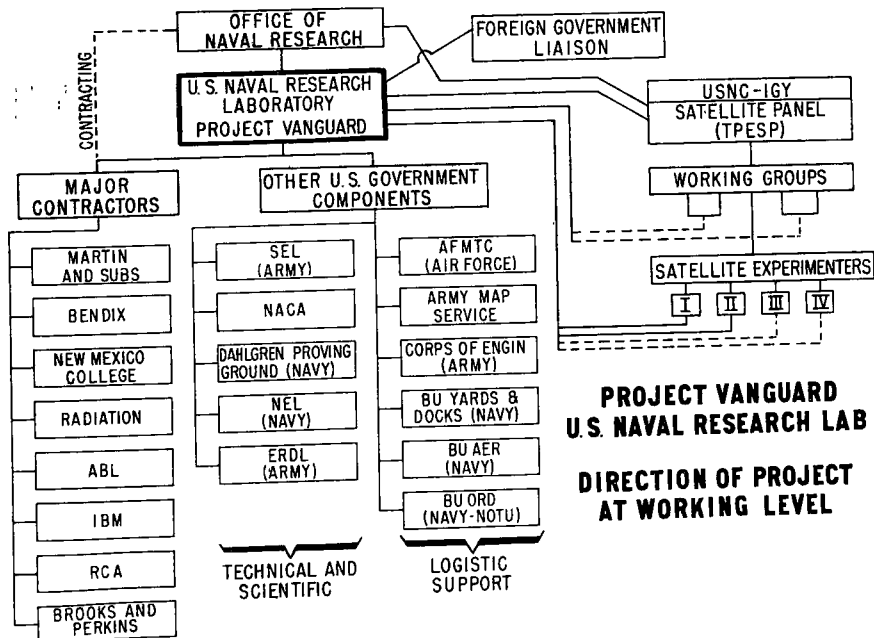
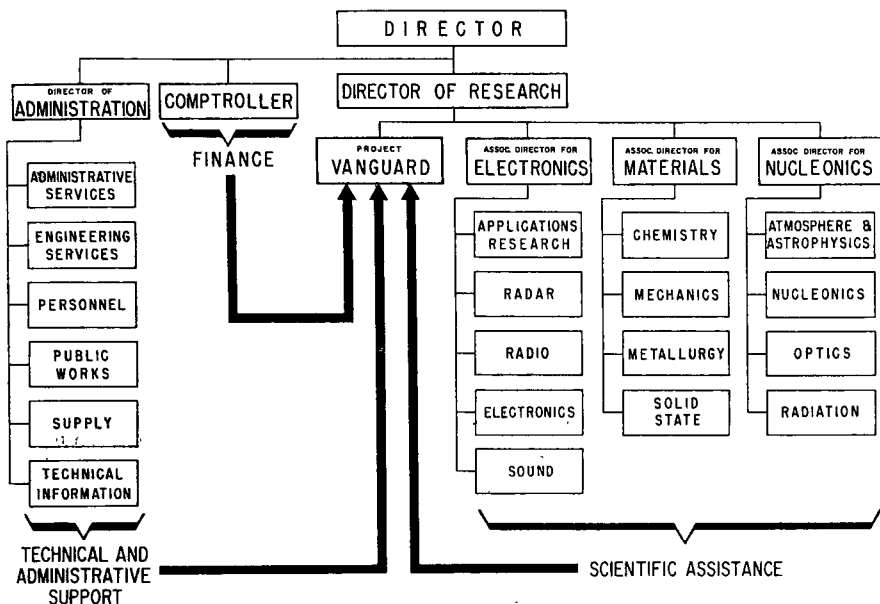
STÖRMER CURRENT RINGS



METEOROLOGICAL STUDIES

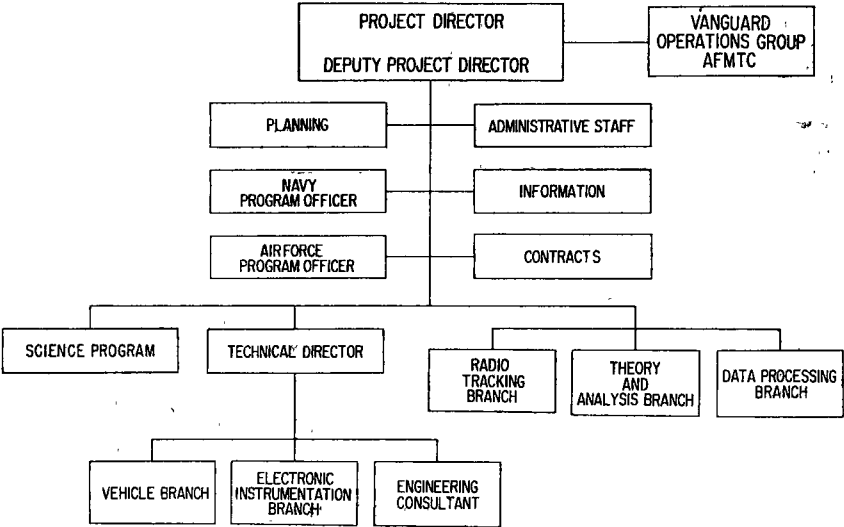


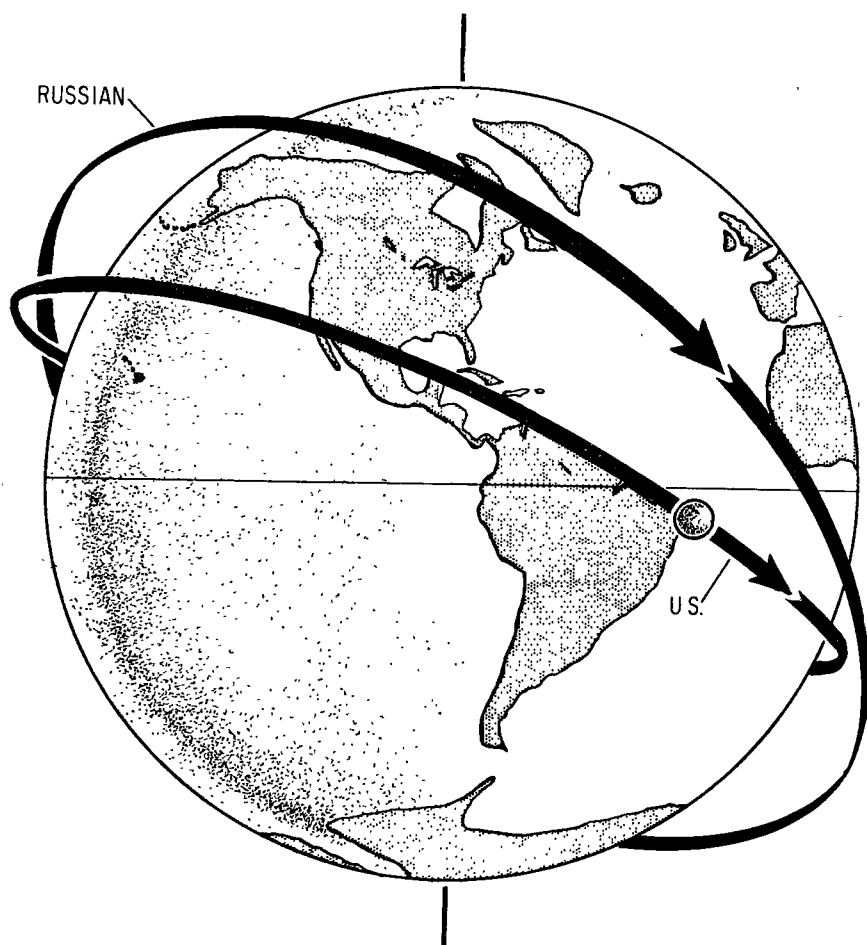
JANUARY 1962
The first satellite in the
Advanced Very High Resolution
Radiometer (AVHRR) series
was launched on January 19, 1962,
from the Cape Canaveral Air Force
Station, Florida, by a Thor-Delta
rocket. The satellite was the first
of a series of satellites to be launched
by the Advanced Very High Resolution
Radiometer (AVHRR) series.



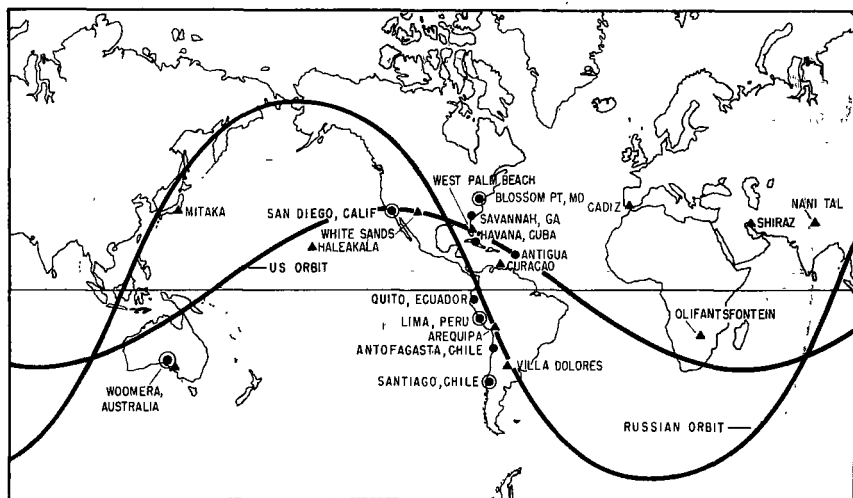
PROJECT VANGUARD
U.S. NAVAL RESEARCH LAB
DIRECTION OF PROJECT
AT WORKING LEVEL

ORGANIZATION OF PROJECT VANGUARD AT U.S. NRL

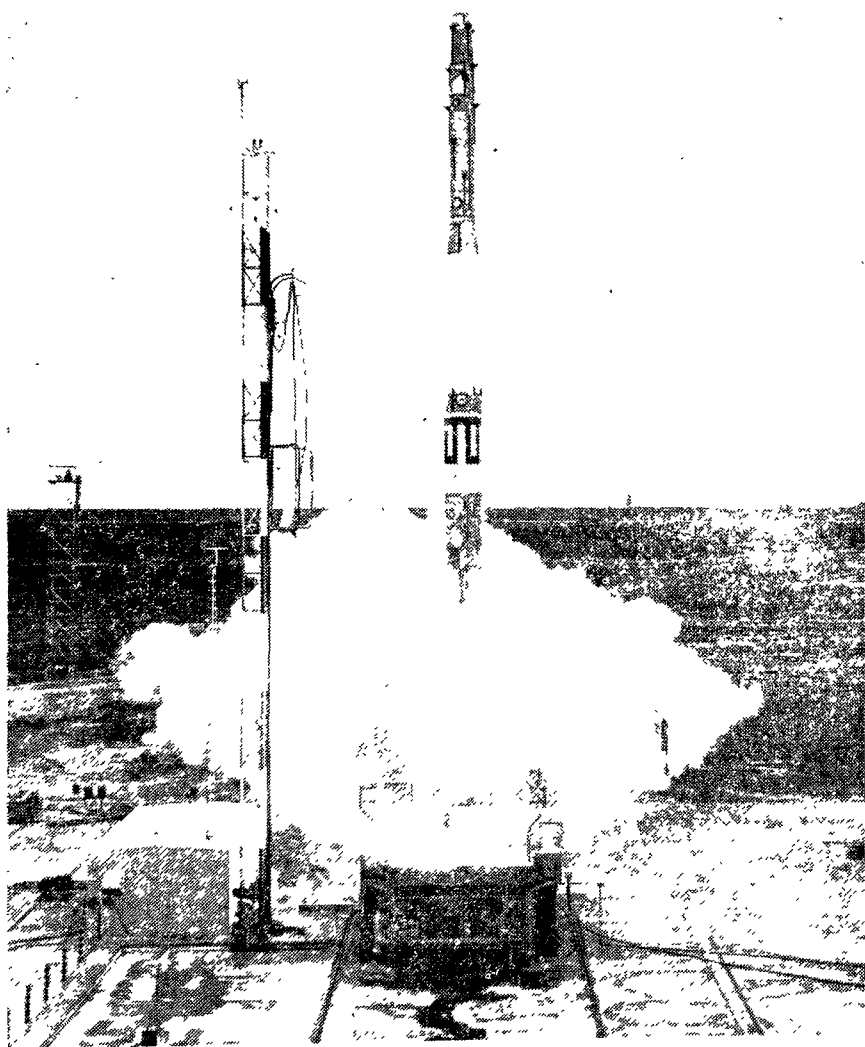




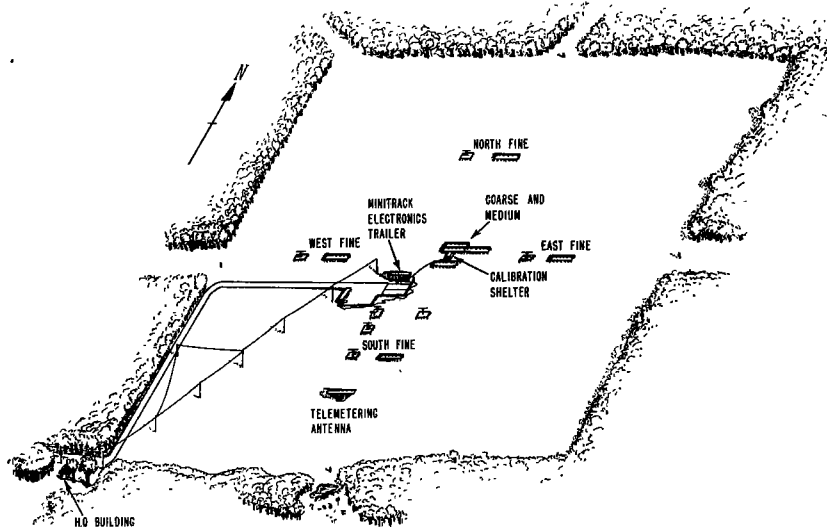
TYPICAL ORBITS OF U.S. AND RUSSIAN SATELLITES



- NRL MINITRACK STATIONS FOR TRACKING U.S. AND RUSSIAN SATELLITES
- NRL MINITRACK STATIONS FOR TRACKING U.S. SATELLITES
- ▲ SMITHSONIAN OPTICAL TRACKING STATIONS

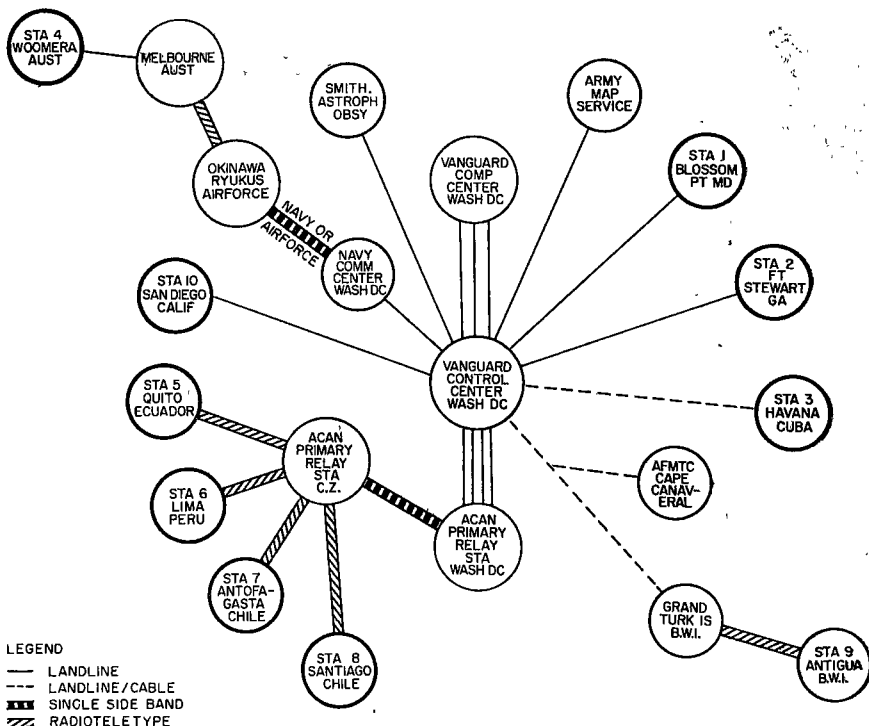


MINITRACK STATION SHOWING ANTENNA SYSTEM FOR TRACKING U.S. AND RUSSIAN SATELLITES

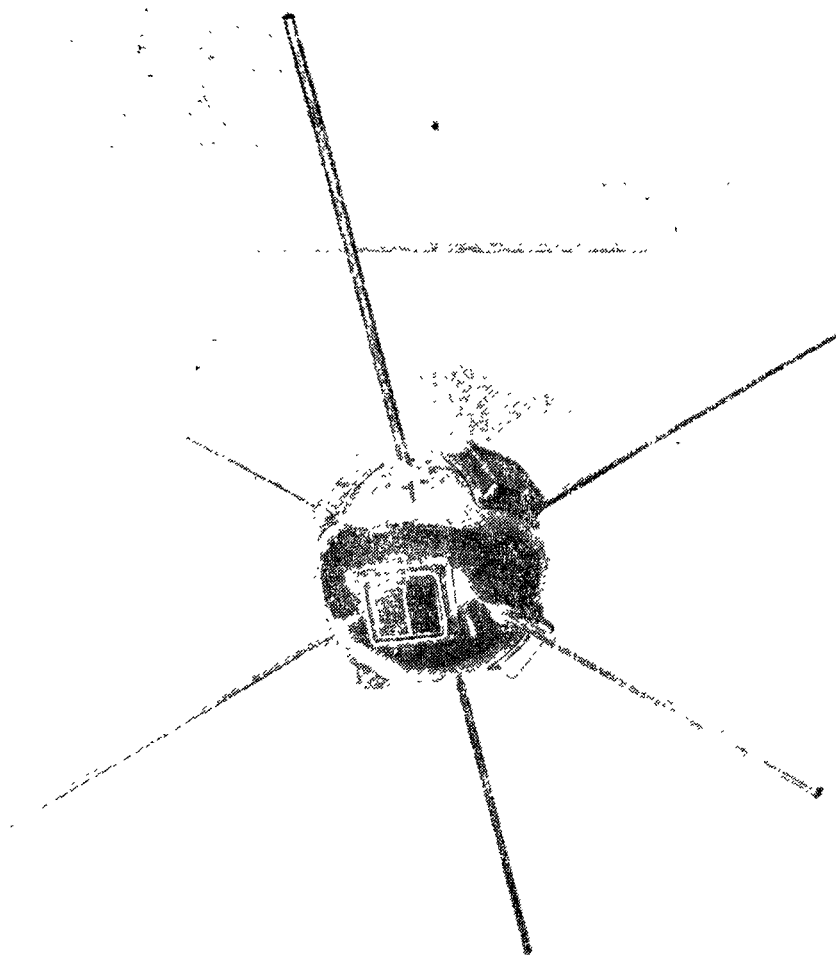


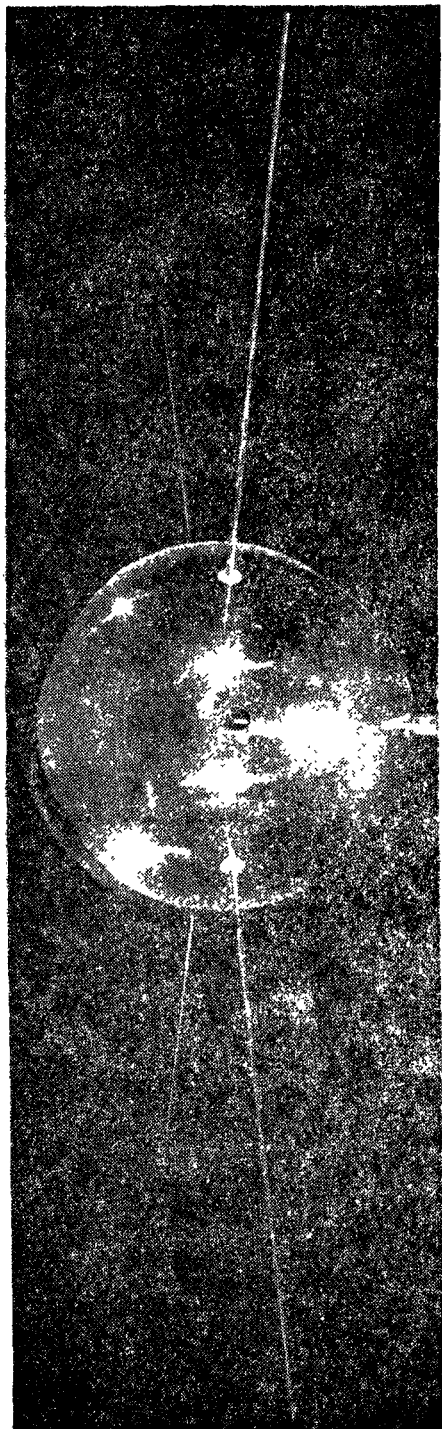
INDICATES ANTENNAS FOR TRACKING RUSSIAN SATELLITE

U.S. NAVAL RESEARCH LABORATORY



VANGUARD-MINITRACK COMMUNICATION NETWORK





Dr. HAGEN. That depends, again, on the statement of the authority, and the method of operation of, in this instance, the Department of Defense. I think it could be so stated that the man in the Department of Defense could proceed in an uninhibited fashion, but it would have to be made clear in the beginning that he did have this authority.

Senator STENNIS. And thereby would be, in effect, exercising or speaking for the President, as being superior in this field to the other departments, say for instance the Budget Bureau or the Department of Defense itself, if need be. He would have to be superior to them.

Dr. HAGEN. I do not like to say yes to that. I feel I am just a little bit out of my field when I start talking about——

Senator STENNIS. I appreciate very much the comment that you made, and you do feel the absolute necessity for this unified authority there with power to reach decisions and then to act?

Dr. HAGEN. I certainly do, if we intend to go anywhere in this area.

Senator STENNIS. Thank you very much, Doctor.

Senator JOHNSON. Does that conclude your questioning?

Senator STENNIS. Thank you very much, Mr. Chairman.

Senator JOHNSON. Dr. Hagen, the committee wants to thank you for your testimony. You have enlightened us on an extremely complicated subject, and I think all of us are much better able to understand it, after your explanation.

Dr. HAGEN. Thank you.

Senator JOHNSON. We hope now that you will go back to your work and speed up the important job that you have, and that you will receive the cooperation that is necessary in order to see that we make all the advances that are possible.

I think that every member of the committee has observed your dedication and your devotion, and we are grateful for the contribution you have made to us today.

Thank you very much.

The committee will hear the Director of Central Intelligence, Mr. Allen Dulles, in the Armed Services Committee Room, for the balance of the afternoon.

If we can conclude with his testimony, we will resume our meeting here in the Caucus Room tomorrow morning at 10 o'clock.

The committee will take a 10-minute recess, and then reconvene in the Armed Services Committee Room on the second floor.

The committee is now in recess.

(Whereupon, at 4:05 p. m., the committee recessed, to reconvene in executive session in room 212, Senate Office Building, at 4:15 p. m.)

INQUIRY INTO SATELLITE AND MISSILE PROGRAMS

WEDNESDAY, NOVEMBER 27, 1957

UNITED STATES SENATE,
PREPAREDNESS INVESTIGATING SUBCOMMITTEE
OF THE COMMITTEE ON ARMED SERVICES,
Washington, D. C.

The subcommittee met, pursuant to recess, at 2:20 p. m., in room 318, Senate Office Building, Senator Lyndon B. Johnson (chairman of the subcommittee) presiding.

Present: Senators Johnson (Texas), presiding, Kefauver, Stennis, Symington, Saltonstall, and Flanders.

Also present: Senators Byrd, Smith (Maine), Case (South Dakota), Bush, and Barrett, members of the Committee on Armed Services; Senator Cooper; Edwin L. Weisl, special counsel; Cyrus R. Vance, counsel; Gerald Siegel, associate counsel; Solis Horwitz, associate counsel; Daniel F. McGillicuddy, Jr., associate counsel; Stuart P. French, associate counsel; George Bunn, associate counsel; Edwin L. Weisl, Jr., associate counsel; Dr. William V. Houston, consultant; Dr. Homer Joe Stewart, consultant; and Dr. Edward C. Welsh, staff adviser.

Senator JOHNSON. The committee will come to order, please.

We plan to hear the Secretary of Defense, Mr. Neil H. McElroy, the Deputy Secretary of Defense, Mr. Quarles, and Mr. Holaday. If necessary, we will have an evening session in order to conclude with their testimony. As the testimony goes on, we can better determine how long we will be here this evening.

Our first witness is the Secretary of Defense, Mr. Neil McElroy.

Mr. McElroy, will you stand, please, and take the oath? Raise your right hand.

Do you solemnly swear the testimony you will give this committee will be the whole truth and nothing but the truth?

Secretary McELROY. I do.

Senator JOHNSON. Mr. McElroy, the subcommittee is fully aware that a tremendous burden has been placed upon your shoulders. We are also aware of the fact that it is a burden which you have assumed only recently.

We do not expect you to give us a long and exhaustive review of all the things that have happened in the past. In the event we must go over history, we would naturally turn to those who have the history at their fingertips, and who participated in making it.

You are here today to tell this committee as much as you can about your plans to meet this serious situation. During the course of our preliminary inquiries, it became apparent that you are one of the very few men in this whole picture who has the unquestioned right to make decisions. There are others who presumably have

that right, but the extent of their authority is in most cases still unclear, at least to this committee.

All of us are very much aware of the tremendous obligations that go with such a right.

Mr. Secretary, it is a pleasure to have you with us today.

Counsel may proceed with the examination. Mr. Wiesel.

TESTIMONY OF HON. NEIL HOSLER McELROY, SECRETARY OF DEFENSE

Mr. WEISL. Mr. Secretary, have you any statement that you wish to read to this committee?

Secretary McELROY. I do have a statement, Mr. Chairman and members of the committee, and counsel, that I would like to make at this point, if I may.

Mr. Quarles and Mr. Holaday and I are, of course, very glad to be with you and to make ourselves available for any questions you may want to ask of us.

However, before you begin your questioning, I have a brief statement to make which will, I believe, report an action which the Defense Department is taking today and which will be of considerable interest to this committee.

REASSESSMENT OF PROGRAM

We have been undertaking, during the past few days, an intensive reassessment of our position with respect to the testing and development program of our IRBM missiles, the Thor and the Jupiter. We have been greatly encouraged by the success that has been achieved in the recent tests of both of these missiles.

It is now clear that while neither of the missiles can be regarded as having completed its development phase, they both are at a point at which we believe we can, on the basis of judgment, make a sound decision to program additional production for operational purposes.

Accordingly, we are today authorizing the placing into production of both the Jupiter and the Thor missiles. By making use of the production capacity now available for both the Jupiter and the Thor, an operational capability can be achieved by the end of 1958 in the United Kingdom; and, as soon as necessary arrangements can be effected, at other appropriate locations.

The Department of the Army has assured the Air Force, which has the operational responsibility for the deployment of the land-based IRBM, of its full support in training of personnel and in other ways in which it might assist in making these weapons operational at the earliest practicable date.

In reaching these conclusions, we have benefited by the advice of Dr. James R. Killian, recently appointed Special Assistant to the President for Science and Technology.

While we cannot at this time define just what new appropriation and other authorization by the Congress will be required, we expect to submit any needed proposals to this end soon after Congress meets in January.

We believe, however, that we will not have extended our commitments beyond a manageable point before Congress may have had an opportunity to indicate its decisions in these matters.

Mr. Chairman and members of the committee, that is the report of the action that I wanted to put before you, and inasmuch as we were able to come to this conclusion late last evening, we felt that it would be appropriate to bring a report of that decision to this committee at this time.

I would like also to say that we considered making a report of greater length on some of the things that we felt might simply give historical background, particularly of a recent nature, with respect to actions that have been taken by the Department of Defense to move along, to speed up the missile program. We decided that it would take up unnecessarily the time of your committee, that most of these things would already have been reported to you, that if they had not already been reported to you they probably would be brought out in the questioning, so we have no other statement to make at this time, and are available for questions as you please.

Senator JOHNSON. Mr. Secretary, I want to make this observation before counsel proceeds with the questioning.

The statement you have made just now to the committee, and to the country, is good news. I hope, as this committee continues its investigation, there will be more reassessments, followed by more good news.

Will you proceed, Counsel?

Mr. WEISL. Mr. Secretary, in your statement you allege that you have been greatly encouraged by the success that has been achieved in the recent tests of both these missiles, referring to the Thor and the Jupiter missiles.

We read in the morning papers that the test of the Jupiter last night was a failure. Can you perhaps give us some light on the relationship of that failure to the report of success in your statement?

Secretary McELROY. I was conscious of that in writing this particular statement, Mr. Weisl.

I would say, of course, that the firing of a missile which was not successful in relationship to what was expected of it could not be regarded as favorable.

The reference that I made to our encouragement had not to do with a specific firing, but had to do with a succession of firings which, in their progression, did test various aspects of each of the two missiles.

This assessment I am talking about is an assessment that has been made by our scientific advisers. We believe it to be correct.

REASONS FOR PRODUCTION

However, the very fact that, in the case of a Jupiter last evening, there was an unsuccessful firing is one of the reasons why we are proceeding at this time with both missiles instead of with one only.

We feel that it is not right—we think it would be a wrong decision—inasmuch as you do not have a thoroughly proved missile as between the two, to move in any direction except on the two together.

Mr. WEISL. In your statement you also informed the committee that you are authorizing, as you have just said, the production of both the Thor and the Jupiter missile.

Now, the Jupiter missile is being developed by the Army; is that not true?

Secretary McELROY. That is correct.

Mr. WEISL. In view of the assignment of roles and missions to the Army, will the Army ever have occasion to use the Jupiter?

Secretary McELROY. Well, as I have said in my statement, Mr. Weisl, the role and mission is and has been assigned to the Air Force, which has the operational responsibility for the deployment of the land-based IRBM.

That decision was made some time ago, and is fully accepted by the Army as well as by the Air Force.

Mr. WEISL. In other words, the Army will have no control over the operation of the Jupiter when it becomes operational, and will not have any use for it in the performance of its roles or missions.

Secretary McELROY. The Air Force will handle the operation of the Jupiter as well as the Thor.

Mr. WEISL. Do you believe, Mr. Secretary, that it is a wise use of brainpower and manpower to have the Army develop a missile that it will have no use for in the performance of its duty in case of war?

RELATION BETWEEN PRODUCTION AND OPERATION

Secretary McELROY. I think in this case that this development of this missile, which has been very ably done by the Army, could be done for another service. I would say that there needs to be a close working relationship between the producing service and the operating service, if they are two different services.

We feel that will be done in the case of the Air Force taking over the Jupiter missile for operation.

Mr. WEISL. In your opinion, Mr. Secretary, would it not be better for the Army to use its brainpower and manpower to work on missiles and other implements of war that it will use in case of war, rather than to work on and implement missiles that the Air Force or some other branch of the service will use?

Secretary McELROY. My judgment, in response to that question, would be that we should use the facilities that are available in the various services for any of the important needs that we have.

The Army was asked to proceed in one direction, and this was with one group of scientists, toward the attempt to get an operational IRBM. The Air Force was asked to undertake the same assignment moving in another direction.

It was regarded as of sufficient importance that we not find ourselves having traveled a blind path by going in only one direction to develop an IRBM; that we should travel two different directions.

To me, it did not make a tremendous difference whether you followed those 2 avenues under 1 service or under 2 services. It is all the Defense Department. And it seems to me a perfectly normal thing to use the best-qualified people you have, whichever the service, in order to get the optimum in terms of performance for this country.

Mr. WEISL. Yes, sir.

REDSTONE MISSILE

Is the Army developing a Redland missile?

Secretary McELROY. Redstone.

Mr. WEISL. I mean the Redstone missile, I am sorry.

Secretary McELROY. The Army has a Redstone missile. The Army is very much interested in developing an improved Redstone missile, and a project is under consideration at the present time between the Army and the Department of Defense looking toward the authorization of the work, research and development work, and ultimate operability of an improvement on the Redstone.

Mr. WEISL. Will the Redstone missile have a range of 500 miles?

Secretary McELROY. I do not know what the range will be. The range will be whatever seems to be required under the conclusion of the Joint Chiefs of Staff for the Army mission.

The Redstone up to this time has been approximately in the range of 175 miles.

Mr. WEISL. Under the assignment by the Defense Department to the Army of its roles and missions is it not limited to 200 miles?

Secretary McELROY. I believe that is correct.

Mr. WEISL. So that if the Redstone missile has a range of 500 miles, it, too, would not be used by the Army.

Secretary McELROY. I think there could be a change in the roles and missions at that point.

Mr. WEISL. I see.

Do you believe there should be a change in the assignment of roles and missions to the Army?

Secretary McELROY. I would like to put it in these terms: The military advisers to the Department of Defense are the Joint Chiefs of Staff, and I would be quite favorable to putting that question before the Joint Chiefs.

Mr. WEISL. I see.

Mr. Secretary, in what respect does the Thor missile differ from the Jupiter missile?

Secretary McELROY. I will have to pass that one. I think perhaps I could refer that one to Mr. Quarles if you would like to have a better informed man tell you.

Mr. WEISL. The reason I asked that question, Mr. Secretary, is that in the course of our limited investigation, we were advised by some informed people in the military service there that there was practically no difference between the Thor and the Jupiter. That they represent a duplication of effort, and that perhaps one or the other should have been made in order to save time, to save manpower, and to save scientific organization.

Secretary McELROY. May I ask if it would be all right for me to refer it to Mr. Holaday or Mr. Quarles because they are better able to answer that?

Mr. WEISL. All right, sir.

Senator JOHNSON. If counsel will permit I suggest that either you ask Mr. Quarles when he is the witness, or, if counsel prefers, he can ask him now.

Do you want to ask Mr. Quarles now?

Mr. WEISL. Whatever the committee desires. I think it would be better perhaps to examine the witnesses separately on that subject, but if the committee desires we might ask the question now to save time.

Counsel certainly has no objection.

Senator JOHNSON. I would suggest you proceed with the examination of Secretary McElroy. Mr. Quarles will be with us the rest of the day.

Mr. WEISL. Mr. Secretary, have you had the opportunity to make a study of our missile program since taking office?

Secretary McELROY. I had the good fortune to be advised by my predecessor to travel around the country some before taking office. And in the course of that I was directed toward a number of our manufacturing plants and installations, both of an aircraft and of a missile character, so that I had the privilege of visiting the Western Development Command where the Air Force is undertaking its development of the ICBM's and of the Thor IRBM, and I also spent some time in Huntsville where I visited and could become acquainted with the people who were responsible for the development of the Jupiter.

I have great confidence in both, I might say.

It was most impressive to me, having come from industry into the Defense Department area, to find the quality of people who are working in both of these important arsenals.

Mr. WEISL. As a result of your studies and investigations, have you come to any conclusion or conclusions with respect to our missile program?

Secretary McELROY. I don't believe I understand exactly what that is pertinent to.

I reached some conclusions like the one we have reported here today.

Mr. WEISL. Well, perhaps I could be more specific.

Have you reached the conclusion that in the missile program we were behind or ahead of the Russians?

I might, in order not to appear as trying to lay the foundation for something else, I might say that in your press conference of November 15, 1957, you stated "We are behind the Russians in missile and satellite developments."

Secretary McELROY. Let me speak to that point.

The question that had been asked of me there led me to give this unequivocal answer since it referred at least as I interpreted it, to a combination of a missile and a satellite.

It seems to me it was quite obvious that we were behind the Russians in that respect because there were already Russian satellites in the air, and we did not have any in the air.

POSITION RELATIVE TO RUSSIA

It is not as clear to me that we are behind the Russians in the overall missile development. As I am sure your committee has found and knows very well, there is a great multiplicity of missiles in our arsenal that are operable.

We are, however, I believe at the present time in this country primarily concerned with the longer range ballistic missiles, and I take it to a considerable extent the question that is being asked is being asked with respect to the two programs of the IRBM and the ICBM.

Mr. WEISL. Let me try to be more specific, Mr. Secretary.

Are we ahead or behind the Russians in the development of the intercontinental ballistic missile?

Secretary McELROY. I don't believe we have positive knowledge as to whether we are behind, and I am quite sure we don't have positive knowledge as to whether we are ahead.

I really have no positive view on that. I would certainly proceed, however, in our programs on the basis that we must accelerate our programs in order to stay ahead, if we are ahead, and to get ahead if we are not ahead.

Mr. WEISL. Have you any basis for believing that we are ahead in that field?

Secretary McELROY. I have no basis for believing that we are ahead.

Mr. WEISL. Have you any basis whatever for believing that we are behind in that field?

Secretary McELROY. On a relative time basis, I do not have any such information.

Mr. WEISL. Well, let me put it another way, sir: When the Russians launched a satellite weighing half a ton, did they have to have an instrument in the nature of an intercontinental ballistic missile to put in orbit an object of that weight.

Secretary McELROY. I am told that in order to put in or build an instrument of the weight of the most recent satellite they needed to have a rocket with sufficient thrust that it would have provided adequate thrust for an intercontinental missile.

However, I am also informed that there are many other things that are required in addition simply to rockets of that thrust before you have an operable ICBM, and it is in those other areas that I do not have the information, I do not believe it is available to any of us.

Mr. WEISL. What other things do we have to know besides the fact that they have a rocket engine that has sufficient thrust to catapult a half-ton satellite in orbit?

Secretary McELROY. Well, here again, I can simply tell you what I have been informed, and not through thorough understanding of this.

It does seem to be evident that you must have a returnable nose cone.

If it burns up on the way back in through the atmosphere to hit its target, then of course it can become an ineffective weapon.

Another thing that the weapon must have is some reasonable guidance system.

So that even though it does have a nose cone that will let it come back and hit the ground, it needs to hit the ground somewhere near where you are trying to smash an objective.

All of this becomes pretty delicate in its instrumentation, because once you put one of these tremendous instruments up in the air and get the ICBM on orbit, it is there and it will go wherever it is to be told to go at that point, and of course its tremendous speed and tremendous distance means that it needs to have very, very great exactness.

So that I do not think we can assume that they have an ICBM from the fact that they are able simply to provide rockets of tremendous thrust.

Mr. WEISL. Mr. Secretary, do we have a rocket engine with sufficient thrust to place a half-ton satellite in orbit?

Secretary McELROY. I am told that the answer to that is that we don't have a single rocket engine but that we would use multiple rocket engines which would be adequate to do what you are suggesting.

POSSIBILITY OF SATELLITE LAUNCHING

Mr. WEISL. So that in your opinion, by the use of multiple rocket engines, we could launch a satellite weighing a half ton?

Secretary McELROY. In my judgment.

Mr. WEISL. In orbit? We might or we could?

Secretary McELROY. In my judgment we could if we had the other knowledge required to put a satellite in orbit, and I think we must prove that by some of the test satellite firings which are scheduled for December and up through March.

Mr. WEISL. In addition to having a rocket engine or a series of rocket engines of sufficient thrust, we must have propulsion of sufficient power to launch such a satellite in orbit?

Secretary McELROY. Yes. Are you talking about fuel?

Mr. WEISL. I am talking about fuel. Do you believe that we have that type of fuel?

Secretary McELROY. I believe from what I am told that with our fuel as it now is available to us, and with the rocket engines that we have available to us, and using them in multiple form, that we can do what you have asked in terms of putting a half-ton satellite up into the outer atmosphere.

Mr. WEISL. While we do not need as accurate a guidance to place a satellite in orbit as we do to hit a precise target with a missile, yet there is some guidance required to place a satellite precisely in orbit, is there not, Mr. Secretary?

Secretary McELROY. Yes.

Mr. WEISL. And the Russians certainly have that much guidance?

Secretary McELROY. Oh, yes. I don't want to underestimate, Mr. Counsel, nor to the committee, the importance of the technical capacity that has been demonstrated by the Russians having placed these two satellites in orbit, which they have done.

Mr. WEISL. I do not want to belabor the point, Mr. Secretary, but I think you will agree that it is safe or safer for this country to assume that the Russians have or will soon have an intercontinental ballistic missile with proper guidance and that they have a solution of the reentry problem.

Don't you think that is a safe course for us to pursue?

Secretary McELROY. That would be the way I would prefer to run the Defense Department on the assumption that we should be prepared for just such a situation.

INTERMEDIATE MISSILES

Mr. WEISL. Now in the field of intermediate missiles, that is to say missiles with a range of up to 1,500 miles, where do we stand?

Secretary McELROY. We stand about where my statement as read to the committee when we began indicated that we stand.

We feel that in the case of both of the Thor and the Jupiter that we have had sufficient encouragement that we can expect to have production models of the Jupiter and of the Thor delivered and put on site with crews that can handle them for firing by the end of 1958, which is just about a year from now.

Mr. WEISL. When you speak of models or types, do you mean by the end of 1958 we will be in production of a sufficient number of

the Thors or the Jupiters or both actually to put them in operation with trained crews.

Secretary McELROY. Yes; I am talking about the first squadron which would be put into the United Kingdom under the agreement worked out with the British some time ago.

I think it was at Bermuda, at the Bermuda conference.

Mr. WEISL. What does a squadron consist of, Mr. Secretary?

Secretary McELROY. A squadron—

Mr. WEISL. Is that a security problem?

Secretary McELROY. Yes.

Mr. WEISL. Would you say that in respect to—

Secretary McELROY. I am a little naive about these things.

Mr. WEISL. Sir?

Secretary McELROY. I am a little naive about this—this is the first time I have been at a public hearing.

Mr. WEISL. So am I. You and I are in the same boat and I hope you will correct me or stop me at any time if I enter into classified or security areas.

It sometimes is difficult to distinguish them because sometimes what the military tell me are secrets, appear in the newspapers or magazines the next day.

Secretary McELROY. It is also true with me.

Mr. WEISL. I am sure. [Laughter.]

Would you say we are ahead or behind the Russians in the field of the intermediate missiles or IRBM's, as they are commonly called?

Secretary McELROY. I have some feeling that we could answer this question a good deal more frankly if we could—if we did not have an open hearing.

Mr. WEISL. Very well, sir.

On October 18, Mr. Secretary, you had a memorandum prepared directing the three services to pinpoint problems concerning the development of missiles, of ballistic missiles.

What was the result of the memorandum?

Did you get any reports?

Secretary McELROY. Yes.

Mr. WEISL. What were the reports?

Secretary McELROY. Weekly reports that I get from Mr. Holaday report on the progress made on the testing during the previous week, and indicate where, if anywhere, any easing up in the rules on such things as overtime might be helpful in accelerating the program.

The principal thing I can say to you is that I do have the weekly reports. Each time that I receive them, Mr. Holaday and I discuss them. He indicates where action may be helpful, and in some cases I have been able to take care of it.

In fact, I think in every case with which I am familiar, I have done so.

BOTTLENECKS IN PROGRAM

Mr. WEISL. Can you without breaching security, tell the committee what bottlenecks you found and what remedies you took to eliminate them?

Secretary McELROY. Well, the principal bottleneck that we felt we found early was the limitation on overtime in certain instances.

Where that was discovered we moved rather quickly in order to authorize overtime since the services indicated that any such freedom from restriction would help them in speeding up of their programs.

Mr. WEISL. Mr. Secretary, in the course of our short study, we were advised that in August of this year a telegram was sent to all manufacturers of missiles that no requests for overtime would be honored.

Are you aware of such a telegram?

That was not sent during your period as Secretary.

Secretary McELROY. I am not familiar with the order being distributed by telegram nor am I familiar with it having been distributed at exactly that time.

Mr. WEISL. If such a telegram were sent, Mr. Secretary, or any other information or notification given to manufacturers, will you be good enough to supply it to the committee?

(The request telegram is as follows:)

In response to the request for a copy of a telegram or other communication sent to manufacturers of missiles in August 1957 prohibiting overtime, there follows the relevant text of a specimen of such a communication addressed to the Douglas Aircraft Co., Inc., attention: F. W. Conant, senior vice president, Santa Monica, Calif., subject: "Elimination of Overtime, WS-315A program," dated August 23, 1957, and signed by H. M. Zinn, Air Force administrative contracting officer at Douglas Aircraft Co., Inc., Santa Monica, Calif.

"Effective September 2, 1957, the administrative contracting officer is limited to approve overtime on all work under subject program other than that relating to the test effort to a maximum of 3 percent, and this amount only upon a showing of justification that such overtime is needed to resolve emergencies and critical bottlenecks. It is not intended that the flight and static test program be impeded, and if necessary and justification therefor is established, the administrative contracting officer may approve additional overtime to support such flight and static test, and engineering effort in support thereof, to an overall maximum of 6 percent of total programed man-hours. In other words; in the event that a maximum of 3 percent is justified and used for work other than in support of the test program, then an additional 3 percent of total programed man-hours may be approved by the administrative contracting officer for support of the test program; and whatever lesser amount than 3 percent of "other" work is justified and used may be added to the allowance in support of the test program up to an overall maximum of 6 percent of total programed man-hours.

"In the event that overtime in excess of that specified above is required, the approval of the Ballistic Missiles Office must be obtained and the procedures set forth in reference B must be complied with.

"If in your opinion you will require overtime during September and subsequent months in excess of that specified above it is suggested that your application therefore be submitted immediately so that a decision by the Ballistic Missiles Office may be made prior to September 2, 1957."

Secretary McELROY. Yes, of course.

Mr. WEISL. Now, in your memorandum you stated that all requests for overtime since you took office, have been approved.

Secretary McELROY. You mean for relief from overtime restrictions?

Mr. WEISL. Yes, from relief or relief from overtime restrictions.

Secretary McELROY. Relief from overtime restrictions.

LETTING OF CONTRACTS

Mr. WEISL. Mr. Secretary, may I ask you whether you have made a study of the letting of contracts to manufacturers?

What I mean is this: As we understand the system, when an order is given to a manufacturer to produce a product such as a missile or

some component part of a missile, there is no incentive given to him to deliver that missile earlier or to make it better.

He receives a cost-plus fixed fee for his services.

If he does bad work, he gets the fee. If he does good work he gets the same fee. If he delivers the product ahead of time he gets no reward. If he delivers the product after he agrees to deliver it, he gets no penalty.

Have you made a study of that entire subject?

Secretary McELROY. I have not made a study of that subject since I have been in office.

I am sympathetic to the question that you raise. I have discussed this with my associates because it has been necessary for me to understand contracting procedures.

I am told that even though organizations such as the Hoover Committee and others who have reviewed practices of the Defense Department have commented somewhat as you have, nevertheless there has been no way found up to this time for operating new and untried weapons like the development of a new missile on the basis that you would suggest which would provide incentive both for improvement and for earlier delivery and for what I would hope would be lower costs.

Mr. WEISL. In order to make clear, and I think I have made it clear, what I am getting at and what the committee wants to get at let me say this:

If our system of free enterprise is right, and we believe it is, it is based on an incentive proposition.

In other words, people to do good work, to make better products, to make them quicker, are given an incentive.

Now in our investigation of the letting out of contracts for missiles and for other defense or military products, we find that incentive provisions are completely absent.

In other words, a supplier has no incentive to deliver goods quickly, to make them better.

He is just as well off and sometimes better off to take his own sweet time and deliver them later, and I think the committee would like you, Mr. Secretary, to make a study of that entire subject or delegate someone to make a study of that subject, to see if we cannot do in defense what business does privately and give people an incentive to get things done quicker and penalize them if they do not get things done quicker.

Secretary McELROY. I will be glad to undertake such a study. I think it should be understood, however, that there are contracts that do provide incentives. They are in the types of procurement which are more standard items.

(The secretary's study on incentives and penalties is as follows:)

Following are illustrations of how incentives and "penalties" are provided within the contracting and administrative authority under which the Department of Defense operates.

As indicated during the hearings, contracts are awarded on a firm fixed-price basis whenever possible. This provides the greatest incentive to a contractor to perform his contract as rapidly and inexpensively as he can. If costs are less than originally estimated, the fixed contract price paid to the contractor leaves him with a larger profit than originally estimated.

It is not usually feasible to enter into a firm fixed-price contract which involves the simultaneous development and production of complicated technical equipment. By and large, such contracts would be inequitable for both the Government

and the contractor, since neither costs nor completion dates can be predicted with acceptable accuracy in advance. As a result, any fixed price to which a contractor would agree would be inflated by sums estimated to meet the contingencies involved in such novel work. However, in contracts for such equipment, clauses are used establishing a target price and providing for redetermination of that price at certain times during the performance of the contract. It is Department of Defense policy to pay a higher profit to those contractors who will assume a greater degree of risk by agreeing to redetermine prices at an early point in contract performance.

In another widely used contract form, the fixed-price incentive contract, a formula is established by negotiation, whereby the price will fluctuate with experienced costs. If the final cost exceeds the target cost, the price is adjusted so that the contractor's profit will be less than if the final costs equal the target. Such contracts provide for ceilings upon upward revision of the price. On the other hand, if the final costs are less than the target, the price is so redetermined as to provide a higher rate of profit to the contractor than if he had merely met the target cost.

Cost reimbursement type contracts, the final category of defense contracts, are performed with the least amount of risk on the part of the contractors. In these contracts there is still an incentive to perform faster and cheaper, because if a contractor exceeds the estimate of costs, his fee is normally not increased, and thus his rate of profit is reduced.

A cost reimbursement type contract is considered only when it is for the procurement of items of such nature and complexity that costs of performance cannot be estimated with reasonable accuracy. Generally, it is used in research and development work where scope and nature of the work cannot be definitely specified; where the supplies are not items regularly manufactured or the services called for have not been previously performed, or partial experience will not reveal a proper pricing level for the remainder of the production; or where specifications are not complete and major changes substantially affecting the scope of the work are expected.

A variation of the cost reimbursement type contract is a cost-plus-incentive-fee contract in which the amount of the contractor's fee will, to some extent, depend on whether he has equaled or run above or below the estimated cost.

In addition to contractor profit incentive inherent in the type of contract used, there are other incentives and penalties which the Department may use in a variety of contractual situations. Some of these are discussed below.

Generally, defense contracts make no provision for increased compensation to the contractor if he performs a contract in a shorter time than provided by the delivery schedule. However, such provisions have been placed in contracts. Recent illustrations are the Snark and B-58 contracts of the Air Force in which a formula was agreed upon providing for an additional fee if the contract delivery schedule was accelerated.

In both negotiated and formally advertised contracts, incentives may be provided to prospective contractors which are not readily apparent in the contract terms. For example, procurement agencies may indicate a desired delivery schedule and inform the bidders that other delivery schedules may be acceptable but that the contracting officer will give great weight in evaluating bids to proposed delivery schedules which are faster than the desired schedule. In such instances, contracts have been awarded to the bidder who has offered a delivery schedule which is most advantageous to the Government. Such contracts will normally contain a corresponding penalty provision providing for reduction of the price in case the agreed delivery schedule is not met.

In some contracts it has been possible to provide for allowance of increased profit if specifications are exceeded. This type of incentive is more or less limited to first development contracts, involving testing for configuration and performance characteristics. This feature has been included in recent contracts for the B-58, F-106 and the Snark missile.

Finally, major manufacturers are aware of the fact that continued procurement of a weapon may well depend upon how satisfactorily early contracts are performed. Thus, the hope for continued Government business is probably one of the prime incentives.

Turning now to some of the "penalty" provisions inherent in defense contracts, in routine production contracts, contractors who either fail to perform in time or who are so dilatory as to endanger performance of the contract are subject to termination for default. Contractors submitting items which do not conform to specifications are subject to penalties contained in the inspection and default clauses inserted in all contracts. This may result in the contractor's having to

replace the item or rework in place, or acceptance of the nonspecification item by the Government at a reduced price.

Liquidated damages clauses are authorized for insertion in contracts. Such clauses may be used where time is of the essence and whenever the contracting department deems such a clause to be necessary for the protection of the Government.

Additionally, contractors who have poor performance records may be denied contracts upon the basis that they are not considered to be responsible bidders under procurement regulations. Contractors who are guilty of a willful failure to perform defense contracts or who have a history of serious failure to perform, or of unsatisfactory performance, in accordance with the terms of one or more contracts, may be debarred from doing business with the Department of Defense for a specified period of time which, under governmentwide regulations, is generally about 3 years.

Secretary McELROY. The real problem has been to find any set of criteria under which you could make incentive payments to people who are working on development contracts such as the IRBM contracts.

But we will certainly take your suggestion, Mr. Weisl, and we will be very glad to work on it because I am confident that in that area as well as many others in which we work, there is definite improvement possible.

Mr. WEISL. Mr. Secretary, we have been advised and perhaps erroneously, but we have been advised that it is illegal to give a supplier a bonus for good work or better work; is that true?

Secretary McELROY. I don't—the word "bonus" I am not clear on.

Mr. WEISL. Well, a bonus means something extra.

Secretary McELROY. Yes.

Mr. WEISL. Some inducement. We have also been told where something extra is given to a supplier of war goods, that on renegotiation that bonus or that extra payment, if it has been made, is immediately cut out.

Secretary McELROY. Well, I have heard those statements and I think there may be some justification in them; but the fact that the renegotiation would take them out does not get away from the fact that there is an attempt made to provide an incentive in those areas where you can set up the criteria.

The operation of the renegotiation act is something which is always discussed pro and con when it comes up.

I don't know what I can say about that one because it usually is determined by someone other than the administrative side of Government.

Mr. WEISL. Mr. Secretary, this committee feels very strongly that where time is of the essence and where our country is in such a critical condition, we ought to bend every effort to give every supplier an incentive to do better work and quicker work so that we get these weapons on time or ahead of schedule.

Secretary McELROY. I think it is a sound observation.

Mr. WEISL. I believe you are sympathetic to that viewpoint?

Secretary McELROY. Absolutely.

Mr. WEISL. And the committee would very much appreciate it if you would study that matter and at your earliest convenience report what has been done in that respect.

(See Secretary's study, p. 203.)

Secretary McELROY. All right.

RESTORES RESEARCH REDUCTION

Mr. WEISL. On October 28, Mr. Secretary, you rescinded an order of your predecessor and restored \$170 million that the Congress appropriated for research and development; is that right?

Secretary McELROY. I rescinded an order which reduced research and development by 10 percent and it was commonly construed as restoring against a million—a billion—

Mr. WEISL. \$170 million, Mr. Secretary?

Secretary McELROY. Against a billion, seven, of research and development total.

Mr. WEISL. Well, \$170 million may not sound like a great deal as compared to a billion, seven hundred million, but some distinguished scientists as Dr. Teller and Dr. Bush testified that in research five or ten million dollars may mean the difference between a good development and no development at all. At any rate, you felt that and we compliment you that you decided to restore this cut.

Secretary McELROY. Well, thank you. We felt that it was in order. I don't say this in any necessary disagreement with my predecessor.

Mr. WEISL. I understand that.

Secretary McELROY. He made his decision on what he felt were fully justifiable grounds, and we made the other decision on what we thought were fully justifiable grounds.

Mr. WEISL. Well, I make the point because people often say that Congress did not give the Defense Department enough money for research.

Well, here is a case where Congress did give the Department money for research and the Department cut the appropriation by \$170 million and you were wise enough and good enough to restore that cut.

Secretary McELROY. I think I should say to you, and that was the reason for my hesitation, that the \$170 million is not research expenditure in the sense in which I believe Dr. Teller would refer to research.

Mr. WEISL. Well, what division of research and development is that cut restored to?

Do you mean—

Secretary McELROY. Part of it was research in the sense that he thinks of research and development. I mean thinks of research—

Mr. WEISL. Are you distinguishing between basic research and applied research?

Secretary McELROY. That is right.

Mr. WEISL. And this was mostly for applied research?

Secretary McELROY. A substantial portion of it was applied research but a considerable amount—and we wanted that to be freed up also—was to restore the basic research contracts which we had mostly with universities.

Mr. WEISL. Thank you.

JUPITER-C AUTHORIZED

On November 8, Mr. Secretary; you authorized the Army to use the Jupiter-C missile to launch a satellite; is that correct?

Secretary McELROY. I don't know about the date but I did authorize that that be done.

Mr. WEISL. And this order of yours reversed an order that was made in the middle of 1955; is that correct?

Secretary McELROY. Well, I am not conscious of its reversing one but it supplemented one.

Mr. WEISL. It supplemented one.

Now, why did you feel that it was necessary, Mr. Secretary, and I am not asking, please don't believe that I ask any of these questions critically. It is merely my effort to get at the facts.

Secretary McELROY. I want to answer quite honestly.

It was my belief at that time in consultation with my associates that there was some doubt, not major but some doubt as to the success that would be attendant upon the launching of a satellite by the selected method, the Navy Vanguard method.

We felt that there had been some evidence that our major competitor in the world was able to do this.

We felt that in the general interest of this country, both nationally and internationally, that we should make certain that we would be able to launch satellites for our International Geophysical Year commitment which went through the year 1958.

So we authorized this additional program as it was announced as a supplement to the Vanguard program simply as a kind of insurance which we felt at that time was desirable to provide.

Mr. WEISL. Yes, sir. Mr. Secretary, Dr. Hagen, in charge of the Vanguard satellite program, testified here yesterday that he had requested top priority for his program and that had he been given top priority he could have launched a satellite ahead of the Russians.

We have examined men from the Jupiter program who told us that they advised the Defense Department that they could have launched a satellite 6 months or a year ago.

PRIORITY REQUEST

Can you give us any information from your study of the satellite and missile programs, first, why Dr. Hagen's request for priority was refused?

Secretary McELROY. I am told by my associates that the request that was reported by Dr. Hagen was not received by the Defense Department.

Mr. WEISL. It was not received? Would it have gone to the Defense Department or would it have gone to some other department?

Secretary McELROY. Well, I would have thought it would have gone to the Defense Department.

Mr. WEISL. So that the Defense Department—

Secretary McELROY. There seems to be some difference here in recollection and understanding. I don't mean to suggest at all that Dr. Hagen would have said something that he did not believe to be exactly as he said it, because Dr. Hagen is a thoroughly fine man.

Mr. WEISL. Yes, sir.

Secretary McELROY. I think there is some difference of recollection.

Mr. WEISL. The Vanguard project, however, was under the Defense Department, was it not?

Secretary McELROY. Yes. It is under the Navy.

Mr. WEISL. So that, if such a request were made, it would have to go to someone in the Defense Department?

Secretary McELROY. Yes; I would have thought so.

Mr. WEISL. Is the organization of the Defense Department so complex that a request of such importance could be made without anyone in the Defense Department knowing anything about it?

Secretary McELROY. I should not think so.

Mr. WEISL. Could it have been lost in the mails?

Secretary McELROY. I doubt it. No.

Mr. WEISL. Could it have gone to the Navy?

Secretary McELROY. Oh, it could have gone to the Navy.

Mr. WEISL. And, if the Navy received it, would it have had to go to someone in the Defense Department for decision, or could the Navy have made that decision independently of anyone in the Defense Department?

Secretary McELROY. I don't know whether this may help at all to clear this up, but I am told that Dr. Hagen reported to this committee that the project had never been given high priority, but there is no understanding on the part of our people, from his testimony, that he said he had requested that it be given high priority.

Mr. WEISL. Oh, no. He positively stated under oath here that he requested high priority and that the request went, first, to the Navy research department, and then he said he understood it went to some committee or some advisory committee. He did not know, however. But he positively stated he made that request.

Secretary McELROY. I think that the only thing I can do is to give you a report after I investigate, because I have no knowledge.

Mr. WEISL. Thank you, sir.

Secretary McELROY. Would you like me to do that?

Mr. WEISL. Mr. Chairman, would you like him to report on that?

Senator JOHNSON. I would certainly like for you to supply all of the information you have in your possession or that you may be able to obtain concerning whether or not the request was made and, if so, to whom it was made and what decision was made in connection therewith. For your information, I should like to read, very briefly, Dr. Hagen's statement so you may have full information on what you may be requested to supply.

Secretary McELROY. Yes, sir.

(The Department of Defense report on Priorities—Vanguard is as follows:)

PRIORITIES—VANGUARD

All military procurement is rated "DO" under the Office of Defense Mobilization-Business and Defense Services Administration industrial priority system. The symbol "DX" is a higher rating and takes precedence over "DO" rated orders, if necessary, to meet required delivery dates. It should be noted that the "DX" rating, prior to January 1957, was utilized by BDSA only on a case-by-case basis to meet specific bottlenecks. In January of 1957, DOD was authorized by ODM to use "DX" rating on a program basis, i. e., to rate all contracts and orders for a program designated as of highest national importance.

As contrasted with the "DO" and "DX" ratings, the master urgency list is part of the system used internally within DOD to identify relative priority of segments of its procurement program. The system provides for four categories of urgency, "S" and categories 1, 2, and 3. "S" items, and those items in category 1 which need special attention, are listed on the master urgency list in descending order.

It can generally be said that a "DX" program rating is part of the industrial priority system, indicating the highest national priority, and an "S" urgency

assignment is part of a DOD system of relative urgencies assigned to guide DOD expediting and special assistance actions in cases of conflict between competing military programs.

The following is a chronology of the priority actions taken with respect to the Vanguard program:

1. On April 2, 1956, the Navy requested that Project Vanguard be included in category "S" of the DOD master urgency list. Prior to this time, no request had been made to place Project Vanguard in any position on the master urgency list.
2. On May 29, 1956, the Department of Defense approved the inclusion of Project Vanguard as item No. 1 in category 1. In this position, Vanguard was outranked by only relatively few urgent military items assigned to category "S," including ICBM and IRBM, and it took precedence over all other items of military equipment, including missiles such as Nike. The priority assigned to Vanguard served to expedite requests for special assistance in cases where production difficulties required application of higher ratings or issuance of directives to break specific bottlenecks.
3. On December 19, 1956, the Navy advised that the assigned priority of category 1, item No. 1, appeared adequate at the time, but that it might become necessary to request a category "S" priority as the program entered the critical testing stage.
4. In view of the urgency which the Vanguard project assumed in October 1957, the Navy Department requested on October 30 that the project be placed in the "S" category and that the Navy Department be authorized to issue "DX" ratings. On November 7, the DOD placed Vanguard in category "S."
5. Concurrently, the DOD requested the Director of ODM and the Administrator of BDSA to authorize the use of the "DX" industrial priority rating for Project Vanguard. Upon receipt of these approvals, the DOD delegated "DX" rating authority for all procurement for the Vanguard program on November 7, 1957.

Senator JOHNSON. Dr. Hagen in his testimony yesterday stated as follows, and I quote:

Dr. HAGEN. Early in the project, (I think I explained earlier that those of us in the project have always had a sense of urgency about this thing) we did request top priority or high priority for the project so that we could get along at the maximum possible speed.

Mr. VANCE. When did you make that request?

Dr. HAGEN. I cannot give you the exact month, but it was some time late in 1955 or early in 1956.

Mr. VANCE. To whom did you make the request?

Dr. HAGEN. Well, in the organization in which we work, our requests go through the office of Naval Research and from there they go on up through the Navy Department to the Department of Defense.

Mr. VANCE. Was your request granted?

Dr. HAGEN. No, it was not, in the form in which we asked it.

Mr. VANCE. Do you know who made the decision not to grant it?

Dr. HAGEN. I do not know.

Mr. VANCE. Did you subsequently make any recommendations with respect to speeding up your launching schedule?

Dr. HAGEN. Yes, we did.

If you will recall, I said that the flight of this third stage was extremely successful, and at that time, we saw an opportunity to advance the date when we could possibly put an object in an orbit, and the way we could do that within the program as it then stood, was to change the later vehicles and put the small satellite on them.

I think it is obvious, in answer to a question that I think Senator Johnson was after earlier, that had this project in the beginning been conceived of as a top priority project, then certainly we would have gone ahead faster than we did under the limitations under which we worked.

Mr. VANCE. That was your recommendation?

Dr. HAGEN. Yes.

Secretary McELROY. Well, suppose I take that as the testimony, and see what we can find to comment on, and we will file such a paper with the committee. (See p. 208.)

Senator JOHNSON. Thank you, Mr. Secretary.

Mr. WEISL. Mr. Secretary—and again I say please don't think that anyone is criticizing you, we are just trying to get at the facts in the best way we can—do you not believe that where a project as important as the launching of a satellite is involved, someone in the Defense Department ought to know how a request for top priority is disposed of?

Secretary McELROY. Well, this is the only thing I can say, and this is speculatively: These requests, a request of the type that you are talking about, would have to go through some hands, and the determination of moving it on to the point of where a decision could be made of such importance as this would be a decision that could be made at each level.

I do not know whether this was passed on or not, but I intend to report to you.

But it could always happen that somebody along the line would not pass it on, and if Dr. Hagen, or the man who was really quite interested in it, did not press to see that it did happen, it might get stuck along the way.

Mr. WEISL. I do not know what Dr. Hagen could have done beyond making the request; and if it happened to Dr. Hagen, it could happen to others in the missile program, and if such a thing does happen to others in the missile program, it might very seriously delay and affect our entire program.

And it may be true that this complexity of organization that we have been told exists in the Department of Defense, has got to be streamlined to a point where the right hand will know what the left hand is doing, so to speak.

Secretary McELROY. I would like to comment on that point.

Certainly we would prefer to have a Defense Department that was about 5 percent as big as it is. I think it is almost impossible to expect to have as simple an organization to handle an operation of the size of this tremendous defense effort, as it would be to have a small business kind of operation.

I think that I could say, though, from my own examination of this missile program—which, of course, because of my having put my neck out a country mile and taking it onto myself, I have had to do that—I do not find that the kind of thing you are talking about has contributed in any important way to a slowdown in the development of the missiles.

There has been, because missiles have a high priority, a very quick line to the point of decision. This is particularly true since Mr. Holaday's assumption of office, but I believe it was true even before that.

Mr. WEISL. Yes, sir.

Senator JOHNSON. Mr. Counsel, I think I should point out, in fairness to the Secretary, that the testimony which goes on at pages 359 to 360 indicates that a second request was initiated by Dr. Hagen; that that request was initiated after Dr. Holaday had been named as special assistant; and that Dr. Holaday received that request directly on the 15th of July of this year; and that he investigated the recommendation and soon agreed that it was a wise move, and immediately proceeded.

Secretary McELROY. I see. We will make that part of our record. Thank you, sir.

DR. KILLIAN'S APPOINTMENT

Mr. WEISL. Mr. Secretary, on November 7, the President announced the appointment of Dr. Killian as his assistant in connection with scientific and technological developments in matters in the defense of our country.

In that same statement or speech, he said that Dr. Killian would provide himself with a staff of competent scientific and technical advisers; that he was authorizing the appointment of Mr. Holaday as a special assistant in charge of the guided-missile program with full power, the same power as the Secretary of Defense had in that program.

First of all, may I ask you, Mr. Secretary, if you know what power Dr. Killian has?

Secretary McELROY. Well, I know what power Dr. Killian believes that he has [laughter], and this is by the statement of the President, so I think that this is—

Mr. WEISL. What is the power that you believe that he has?

Secretary McELROY. His power is to serve as a scientific adviser to the President. Inasmuch as a great amount of the application of science in Government is concerned with the defense effort, he would work closely with the defense effort in order to be in a position to advise the President about the scientific applications in defense.

I do not believe that it was intended at any point for Dr. Killian to come into the Defense Department for order giving, and I do not believe that he thinks so.

Mr. WEISL. Yes, sir.

Well, have you worked out some *modus operandi* so that you and the President's adviser, Dr. Killian, cooperate and work together on the speedup or the acceleration of the missile program?

Secretary McELROY. We think that we have. We start from the fact that both Mr. Quarles and I, and I believe also Mr. Holaday—but I speak with positiveness about Mr. Quarles and myself—have known Dr. Killian for many years; and since we have the kind of advance knowledge of him and his working, we consider that his coming into this picture is of nothing but complete advantage to the entire effort, regardless of where he puts his time.

He has been at the Defense Department, for example, this morning for several hours, working with us on certain high-priority programs.

He has been doing that in order that he may advise the President with respect to them in the way that I think the President has hoped that Dr. Killian would serve as a scientific adviser.

I think we have a very good relationship started, and we intend to keep it going that way, because we think he can be of very great help to us as well as to the President.

Mr. WEISL. However, he has no power.

Secretary McELROY. I would say his power is advisory, but with his strength of position with the President, and the President having unquestioned power, he also has very considerable power by just kind of rubbing off.

KILLIAN DOES NOT HIRE PEOPLE IN DEPARTMENT OF DEFENSE

Mr. WEISL. But he has no direct power to hire anyone or fire anyone, to raise anyone's salary?

Secretary McELROY. He has a staff, but he does not have direct power to hire people in the Defense Department.

Mr. WEISL. What staff has he?

Secretary McELROY. I would rather be relieved of that one, because I have not really gone into that in detail with Dr. Killian. I know he is going to have some staff.

Mr. WEISL. Well, the staff that he has advises him?

Secretary McELROY. Works with him, helps him.

Mr. WEISL. Works with him. And then he, in turn, advises the President.

Secretary McELROY. Yes, sir; that is my understanding.

Mr. WEISL. Then he carries that advice over to you.

Secretary McELROY. Well, that is right. Principally, I would say that he not only advises us, but he becomes familiar with what we are doing, or propose to do, in such ways that he can advise the President with respect to those programs.

Mr. WEISL. Mr. Secretary, Dr. Killian is a very distinguished scientist, and an experienced man in administration, and he has worked in Government and headed commissions before.

Back in 1955, he made a thorough investigation of the missile and satellite program, and made certain recommendations.

Without going into those recommendations—we will have to go into them in closed session—do you of your own knowledge know whether those recommendations were followed?

Secretary McELROY. I do not know. I do not know specifically about those recommendations, except in quite general terms, so I would prefer not to comment in response to that.

Mr. WEISL. Now, pursuant to the President's directive, you appointed Mr. Holaday as Director of Guided Missiles, and in that directive you stated:

The Director of Guided Missiles will direct all activities in the Department of Defense relating to research, development, engineering, production, and procurement of guided missiles.

Does that mean that he has authority only in the Department of Defense, or does he have authority in the various branches such as the Army, the Navy, and the Air Corps, in connection with guided missiles?

Secretary McELROY. He has the authority of the Secretary of Defense, to whom he is an assistant, in the various services as well as in the Office of Defense.

Mr. WEISL. In our effort to find out just what his authority is, Mr. Secretary, we examined the press conference that you held in that connection.

Secretary McELROY. I remember I was pressed considerably on this point.

Mr. WEISL. And in that press conference, when you were questioned about what Mr. Holaday's new powers and responsibilities were, you stated, and I quote:

He is not an operating executive who directs individuals who are working on any of these missile programs. That is done in the services themselves.

Now, how can a man be a director of the guided missiles program when he has no authority to direct the individuals who are working on any of these missile programs and when that work is done in the services themselves? Now, just how does that work?

Secretary McELROY. Well, it is a very good question. [Laughter.]

The answer must stem from the fact that we concluded—at least this was a separate conclusion of mine which I take it was a followup on a conclusion reached by my predecessor—that any change in the operation of the missile program at this particular stage would have really dangerous possibilities of slowing down the entire effort.

So that instead of there being any belief that we could actually make a gain by pulling all of them together under one actual directing director in the sense that I think you were reaching for, that—

Mr. WEISL. I am not reaching for it. That is what the public, I think, and the committee have been led to believe that Mr. Holaday is.

HOLADAY'S AUTHORITY ENLARGED

Secretary McELROY. I think that I made clear in my statements just what Mr. Holaday was not expected to do as well as what he was expected to do. We did not think that there should be any change in the actual operation by the services of their respective missile programs, for the reason that I have given.

We felt it would actually have a dangerous possibility of slowing down the entire effort at a time when we could not, in this country, afford to slow down.

So what we felt we should do was to extend the authority of Mr. Holaday, which up to that time had been restricted to certain types of missiles, so that it would cover the entire missile field.

That was done in this directive.

And the other thing was to give him, through the addition of the title of Director of Guided Missiles, an added authority of the title to supply his coordinating authority with direction.

It is not an order-placing, it is not an order-canceling kind of direction. It is a coordinating direction.

Mr. WEISL. Now, Mr. Secretary, our Commander in Chief told the people as follows on November 7 of this year:

I have directed that the Secretary make certain that the guided-missile Director is clothed with all the authority that the Secretary himself possesses in this field, so that no administrative or interservice block can occur, and to work intimately with this official.

Now, I think a reasonable construction of that direction by the President of the United States is that Mr. Holaday is the boss, and he is going to direct the missile program and have power and responsibility over everyone connected with it, and can direct the Army, the Navy, or the Air Force, after hearing their story, and that he would be the boss. At least that is my poor—perhaps I am dumb in believing that that is what was meant, but that is the way I interpret that language.

Secretary McELROY. We interpreted it in the way in which we took action.

Mr. WEISL. But, if he has no authority over the men in the Army, Navy, and Air Force who are managing and developing these guided missiles, he is nothing again but an adviser.

Secretary McELROY. I think the men in the Army, Navy, and Air Force know that he has authority.

Mr. WEISL. They may know it, but, unless he has the power to enforce that authority, what good is their knowledge of it?

Secretary McELROY. He has the power of the Secretary of Defense, to whom he is an assistant.

Mr. WEISL. But you said in your interview, Mr. McElroy, that he does not have that power.

Secretary McELROY. I think, if you will read it, that you will find that I did say so, because that was my entire point; that the strength of the assistant to the Secretary, who is also the Director of Guided Missiles, is derived from his position as assistant to the Secretary of Defense.

Mr. WEISL. But you say he is not an operating executive?

Secretary McELROY. That is correct.

Mr. WEISL. How can a man have power without being an operating executive? I may not understand the language properly. Maybe I am not a good enough or experienced businessman. Maybe I am just a poor country lawyer, but it seems to me that a man with power must be an operating executive. He certainly is not the head of a debating society.

Secretary McELROY. There is no question but what if the Secretary, if I were operating the program myself, that I would operate it in the same way that Mr. Holaday is operating. I would operate through the services.

Mr. WEISL. I do not say I—but it seems to me that, of course, you have got to operate through the services, but somebody has got to be the boss, and if a fellow is a director of a program, he has got to be the boss of that program, unless you overrule something that he wants to do, and that was what the President, I think, meant when he said that he will be clothed with the same power that you have, and you certainly have the power to tell the Air Force and the Navy and the Army what to do in guided missiles. In other words, you do not leave the discretion to them, I hope, entirely.

Secretary McELROY. No.

HOLADAY RECOMMENDED MANUFACTURE OF BOTH

Mr. WEISL. Your statement which you made to us today indicates that you have decided or someone decided that the Thor and the Jupiter programs were to go ahead separately. Did Mr. Holaday decide that?

Secretary McELROY. It was on Mr. Holaday's recommendation.

Mr. WEISL. Who decides which project goes to which service? For instance, suppose there is a new missile that someone suggests, and it looks like a reasonable one to put into operation. Does Mr. Holaday have the power to decide which service that missile goes to and which service develops it or who develops it?

Secretary McELROY. What customarily happens is that the service goes to Mr. Holaday to propose this missile, and Mr. Holaday will then recommend to the Secretary of Defense.

Mr. WEISL. Then what happens?

Secretary McELROY. The Secretary of Defense discusses it with Mr. Holaday, who then, in all probability, refers this to the Joint Chiefs of Staff for their determination of whether there is a need for this missile, a military need, and the Joint Chiefs of Staff—

Mr. WEISL. Then what happens after the Joint Chiefs of Staff consider it?

Secretary McELROY. Then there is a question of the financing of it. If the Joint Chiefs of Staff say that this is needed, if the project is to be financed, the approval then can be given, provided the financing is available in appropriations already made.

Mr. WEISL. Who gives that approval?

Secretary McELROY. Who gives the approval?

Mr. WEISL. Yes, sir.

Secretary McELROY. To proceed?

Mr. WEISL. Yes, sir.

Secretary McELROY. The Secretary of Defense.

Mr. WEISL. Does it have to go to the National Security Council?

Secretary McELROY. It would depend on the importance of the change.

Mr. WEISL. How important must it be before it goes to the National Security Council?

Secretary McELROY. If we have any doubt about it, we would send it there.

Mr. WEISL. And if you had no doubt about it, you would not have to send it there?

Secretary McELROY. Correct.

Mr. WEISL. Are there any committees working under Mr. Holaday?

Secretary McELROY. Yes, there is a Ballistic Missiles Advisory Committee.

Mr. WEISL. Who is on that Committee?

Secretary McELROY. I do not have all of the names. I am sure that we can get them for you.

Mr. WEISL. Are they people from within the Department, or are they outside of it?

Secretary McELROY. They are practically all from outside.

Mr. WEISL. And the name of that Committee is the Ballistic Committee, the Ballistic Missiles Committee?

Secretary McELROY. I have lost a word in there. The Ballistic Missiles Advisory Committee is the one I am talking about. It is outside people.

Mr. WEISL. And what happens? What powers or duties do they have or what do they do?

Secretary McELROY. They advise.

Mr. WEISL. Whom?

Secretary McELROY. Mr. Holaday. They are people highly qualified, technically.

Mr. WEISL. Are they qualified to pass on missile programs?

Secretary McELROY. They are qualified to advise Mr. Holaday on missile programs.

Mr. WEISL. I know that, but are they people experienced in that field? What are they? Are they scientists or professors?

Secretary McELROY. Professors mostly.

Mr. WEISL. And they advise Mr. Holaday what to do about a particular missile?

Secretary McELROY. Yes.

POWER OF THE COMPTROLLER

Mr. WEISL. Can the comptroller of the Defense Department overrule Mr. Holaday's recommendations on the ground that funds are not available for a particular missile program?

Secretary McELROY. Certainly if there is no money to finance a program, then there will either have to be some action taken that can be done internally, that sometimes is possible—

Mr. WEISL. What power has the comptroller got in the Defense Department?

Secretary McELROY. The power the comptroller has is to say whether there is any financing available for a program as proposed by anyone of the services or by the Department of Defense itself.

Mr. WEISL. He has a pool of money or an appropriation of money available for general projects. Does he decide whether that pool of money or any part of it should be allocated to any particular project or not?

Secretary McELROY. If you are talking about a reserve fund—

Mr. WEISL. Yes.

Secretary McELROY. There is a reserve fund to the Secretary of Defense. There is a research and development fund under discretionary authority of the Secretary of Defense. He has no authority to dispense that money. That money, if it is to be assigned, would be done by the Secretary of Defense.

Mr. WEISL. To cut it short, Mr. Secretary, do you have complete power over the Comptroller of the Department of Defense? Can you direct him what to do with the money that he has in any fund?

Secretary McELROY. So long as he has the money.

Mr. WEISL. So long as he has the money, you can direct him?

Secretary McELROY. That is correct.

Mr. WEISL. Does the atomic airplane come within the classified or secret phase of the Defense Department?

Secretary McELROY. If you ask very much about it, it does.

Mr. WEISL. Sir?

Secretary McELROY. What you have said so far does not but almost anything else you say will.

Mr. WEISL. I did not hear what you said.

Secretary McELROY. I said what you said so far would not but almost anything else would.

Mr. WEISL. Any delving into that?

Secretary McELROY. Yes, I think that would be quite sensitive.

Mr. WEISL. I must confess, Mr. Secretary, perhaps due to my obtuseness, that I still do not know what power Mr. Holaday has.

Secretary McELROY. That is the reason I said when you asked it, it was a very good question. I personally believe that Mr. Holaday does not feel deficient in authority. I think that he has what is needed to be an effective executive in the missile field, but I also would admit that my explanation of it of necessity leaves something to be desired for those people who simply listen to what I say.

Mr. WEISL. I would feel, Mr. Secretary, that if the chairman of this committee authorized me to conduct an investigation of the preparedness program, that he would not tell me that I could not question witnesses without his consent, that I could not go into this department or that department without somebody's consent, that I had to have some power to examine and question witnesses without his consent.

Anyway, I will not belabor the point any further.

Senator JOHNSON. Counsel, could I interrupt there to ask this question.

Mr. Secretary, do you consider yourself the real missile director?

Secretary McELROY. No, I do not. I consider Mr. Holaday the missile director. I consider that I am easily accessible to him when he needs the power that I happen to possess. Also, I have undertaken to review this program once a week to be certain that anything that I may contribute to Mr. Holaday can be certain to be there for him.

Senator JOHNSON. Mr. Holaday has the right to suggest, to recommend. You have the power of decision, is that correct?

Secretary McELROY. That is correct, and he sees me with regularity. I think he probably in the last few weeks, as you would guess, has seen me more consistently and steadier than anyone else in the Defense Department, with the exception of Mr. Quarles.

Senator JOHNSON. This looks like a new version of the old game, "Missile, missile, who has got the missile."

It seems to me that Dr. Killian has been selected to advise and suggest and counsel with the President, but he is clothed with no authority to make or enforce the decisions or to issue or place into effect orders or commands. It seems to me that Mr. Holaday is in somewhat the same situation. He is clothed by you with authority to coordinate and to keep in touch and to make recommendations, to get information and perhaps to act as a reporter; but the actual decision itself, the real missile program direction, the real power, the authority to get the job done, to say yes or no, right or wrong, do or do not, is with the Secretary of Defense.

Is that an unfair interpretation?

Secretary McELROY. I think you have to say that. It falls right in place, what you have said, from the position that Mr. Holaday has as assistant to the Secretary of Defense.

Senator JOHNSON. Then it is fair for the public to assume that while we have some window dressing, and while it might be necessary and desirable that all of us have counsel and advice and coordination under us, that Dr. Killian and Mr. Holaday are, in effect, counselors and advisors, but the operating heads, the decisionmakers, are the Secretary of Defense and the President of the United States?

KILLIAN'S CONNECTION WITH DEPARTMENTS IS ADVISORY

Secretary McELROY. Let me say that in my judgment, Mr. Chairman, that would apply a good deal more to Dr. Killian than it would to Mr. Holaday. We think of Mr. Holaday as having a good deal more authority in terms of working out a final program in the various missile fields, that he and the operating departments can then present to the Secretary of Defense, or that he himself can present to the Secretary of Defense; whereas I would judge that Dr. Killian—I do not like to be in the position of saying what he is to do, but nevertheless this is my understanding—actually is simply a man who understands and advises the President. And at the same time because of the very force of his standing in the country, would be listened to, but only advisory, by the departments with whom he is talking for the purpose of getting information to inform the President.

Senator JOHNSON. Thank you, counsel.

Mr. WEISL. Mr. Secretary, on November 15 I believe you announced the creation of a post for a manager of antimissile and military space-project developments. Have you made that appointment?

Secretary McELROY. No; we have not made the appointment. I wish that I had had time to settle into that one and do it because we would like to do it as quickly as we can. But the recruitment has not yet been accomplished. We want a very good man for the job.

Mr. WEISL. What is the purpose of that post?

Secretary McELROY. The purpose is an immediate one: to pull under a single manager—this is the first time this has been done in the Defense Department—actual operating units for the research and development work that goes on in the antimissile missile field and in the satellite and space applications field.

Mr. WEISL. What power will that manager or director have?

Secretary McELROY. He would have complete responsibility.

Mr. WEISL. In the same way that Mr. Holaday has it?

Secretary McELROY. We have a different point of view on this man. We feel that these programs have not gone so far but that we can pull them together without any slowing down of the development of those programs under a single director, a single manager. We think that there is sufficient complexity in both of these fields that the research and development assignment could very well be handled outside of the services as part of the Department of Defense, and then as you come close to the time when there may be an operation of this weapon, whatever it may be, it would be turned over to one of the services for it to deploy and use.

It is not thought that this agency would actually serve as a deploying agency.

Mr. WEISL. Do you not think, Mr. Secretary, and I am merely exploring, Mr. Secretary, you understand that, of course, do you not think that creating a post of a missile director on the one hand and then an antimissile director on the other hand might just add a little more complexity and more confusion? Why cannot the director of the missile program also be the director of the antimissile program?

Secretary McELROY. We considered that. We reached a conclusion, which we think is a right one, that the man who is head of the missile program in this country has got about as much on his shoulders as any one man should have. We think Mr. Holaday is loaded with as much responsibility as he should have in order to give stimulation and coordination to the missile program. For that reason, we felt that what we call advanced weapons—which is our term for that advanced-weapons agency, if that happens to turn out to be the term that we use—should not be put also upon Mr. Holaday, but that we should choose someone else who would then organize in a different way from the way Mr. Holaday operates to make his job effective and resultful.

Mr. WEISL. Would not the Army, the Navy, and the Air Force have their own antimissile missiles?

Secretary McELROY. They would not work on antimissiles under this concept. The work that they have done in the past would be pulled together and centralized within the single-manager agency that I am describing to you.

Mr. WEISL. Would that single manager have authority over the antimissile activities of the people in the Army and in the Air Force and in the Navy, or would it be, as you said, the same as Holaday who would not have that direct authority over those people? \

Secretary McELROY. He would have authority. Again it might very well be through the Secretary of Defense, but we have discussed this thoroughly with all of the departments of the Defense Department, all of the Army, the Navy, and the Air Force, and it is fully agreed when this agency that I am discussing takes form, it will take over all activities that any of the services are conducting in these areas. Up until then, in order not to lose any momentum, each of the agencies that has been working in these areas will continue their programs.

Mr. WEISL. This man will also be a director of the satellite program, the same man.

Secretary McELROY. He would have satellite applications?

Mr. WEISL. Is not the satellite very closely interrelated with the ballistic missile? Is not the satellite a projection, instead of projecting a warhead to a target, you project a satellite in orbit? Does not that really belong to the fellow that has got charge of missiles?

Secretary McELROY. Yes. The kind of satellite applications that we are talking about are not the type which are in the IGY. That would continue with Mr. Holaday, in our thinking.

We are talking about the highly technical missile applications which may go quite far, and again I think we had better talk on that later.

Mr. WEISL. That is what I am talking about. In other words, is not any kind of satellite another type of object that is being launched in orbit into outer space? In other words, instead of launching a warhead to a target, you launch a satellite in orbit into outer space.

Now, does that not belong to the fellow that has charge of missiles? I do not want to belabor the point.

Secretary McELROY. In our judgment, it did not. They do have in common the requirement that there be a thrust into outer space. That much they do have, but that is not the end of the road by any means on the antimissile missile, nor is it on the various satellite applications.

Mr. WEISL. Perhaps we can go further into that in closed session with Mr. Quarles.

Now, I also note that on November 19, you announced the creation of another office to direct development of nuclear power for planes and missiles.

What will that fellow have to do? What will his power and responsibility be? Maybe you were led into making some of these announcements before you got wise to this job.

Secretary McELROY. The advice I have is that that one should be kept for the closed session also.

Mr. WEISL. I hope, Mr. Secretary, that you will not consider any of these questions as in any way a criticism upon anything that you have done.

We are merely trying to explore this complex and difficult and sometimes ununderstandable organization to see if we cannot help speed up and accelerate this program which is so, so vital, where time is of the essence.

Secretary McELROY. I think all the questions have been——

Mr. WEISL. There is no criticism of you in any way, Mr. Secretary.

Secretary McELROY. I think all of the questions have been very reasonable, and I would like to compliment the entire committee proceedings so far that I have been able to follow through the press.

Mr. WEISL. Now, Mr. Secretary, just after Sputnik II was placed in orbit, you were quoted as having stated, and the statement was in *Aviation Daily*, which I am told is a very reputable magazine, on November 5, 1957, that "the launching of Sputnik II would not cause any change in the present United States rocket and satellite program."

I am sure you have changed your mind since if you did say it at that time.

Secretary McELROY. I think that was a simplified reporting of what I said. I think that what was said at that time and what was intended to be said was that this was not in itself an important change in the balance of military power between this country and the major opponent that we have.

Of course, the implications of it, looking down the road, do give us some apprehension.

Mr. WEISL. Mr. Secretary, may I go back to the directive that you issued on October 18, in which you ordered a three-service study of bottlenecks in the missile program, and may I go into specifics so that we do not overlap into the classified or the secret.

Was any report made to you about the complexity of the organization in the Defense Department standing in the way of speed and efficiency?

Secretary McELROY. No; I do not recall any such discussion.

Mr. WEISL. Do you have any views on that, or have you had time to formulate any?

ORGANIZATIONAL STRUCTURE OF PENTAGON UNDER SURVEY

Secretary McELROY. I would only say this to the committee, that we are planning to pay considerable attention to the organizational structure within the Defense Department in the hope that we will find ways in which there can be simplified handling of major problems.

However, I believe that this was an area which is of such really major importance that anyone coming into this position should take ample time to find out exactly what the workings are before thinking with others—I certainly would want advisors on this—toward any change.

The people that talk about the many channels that seem to be almost inevitably overlapping, I think, have the benefit of the argument when anybody looks at the Defense Department chart. I would hope that there might be some simplification. But I would not want to say that I have any real right to that judgment in the short time that I have been here.

Mr. WEISL. I am sure you are aware of what all of us have seen and what the public has seen; namely, this tremendous chart of bureau on top of bureau, committee on top of committee, office on top of office, and really, to the average unsophisticated or even sophisticated person, it looked like the most complicated jigsaw puzzle that ever was invented.

There certainly must be some way, and I am sure you can do it, Mr. Secretary—you are a man of great ability and experience in business—I am sure you would not tolerate that complexity in your business, there must be some way of streamlining this thing in an emergency such as we face, where time is of the essence and where

everything possible should be done to break down any bottlenecks that exist in a complex organization.

Secretary McELROY. I would certainly hope so, although I am somewhat restrained by the knowledge that I have had from very competent people who have preceded me in this job, and I feel confident they would also have worked in this same direction. Nevertheless, I might blunt my own lance, but I will have a try at it.

Mr. WEISL. The chairman thinks you had better make your own way and not rely too much on these so-called experienced people, because they have become traditionalists and they hate to change.

The chairman tells me, and I am sure what the chairman says is shared by the committee, that you are the kind of a fellow who will get action and who will simplify complex structures and get things done, and delegate power where power ought to be delegated, and when you delegate power, give the fellow that has got the power the authority to exercise it.

Now, then, another field in which we have been told there is a bottleneck is this timelag in making decisions when a request is made for a decision.

Dr. von Braun in Redstone says, "I have got to do this." He tells me that it takes forever, in his words, to get a decision.

Has any report been made to you about the need for speeding up the giving of decisions to people so that you do not have to go through these committees of scientists and these advisory boards and these other boards?

DEFENSE OF COMMITTEES

Secretary McELROY. I think that many of these boards that you refer to are for quite a good purpose. These are tremendous programs. There are tens and hundreds of millions of dollars involved in many of these decisions that some of our people would like to have made promptly. I can understand the desirability of a quick decision, but it needs to be a quick, informed decision.

Mr. WEISL. Yes; of course.

Secretary McELROY. And because of the tremendous size of these decisions, they often really should take some time.

Now, just a little decision, that seems so in the two pages I read here to you today, required many, many a lamp with the midnight oil burned just to come to that kind of a conclusion.

Mr. WEISL. I am sure of that, sir.

Secretary McELROY. And I am for speeding them up, but I do think that the people of this country also look to us, as they particularly do sometimes when the Russian is quite as gruff as he is at the moment, to be sure that the decisions we have taken have not been too hasty, and have been made with consideration of efficiency as well as rapid moving forward.

Mr. WEISL. That is right. You cannot always be perfectly right.

Secretary McELROY. I do not think you ever are.

Mr. WEISL. Sometimes you have got to make a judgment in time, because a good judgment made when it is too late is just as bad as a bad judgment made earlier.

Secretary McELROY. That is correct. We would prefer to have waited on this decision that I announced to you today if you had time. This was a decision that is going to cost the people somewhat more

than the decision would have cost if we had been able to go through the complete testing procedure before making an order for missiles. This is a decision that is made on judgment, and because it is made on judgment, it unfortunately needs to cost a little bit more money.

Mr. WEISL. Another criticism, Mr. Secretary, that has been made is in the field of research.

You have very properly and very encouragingly restored \$170 million to research, but we have been told that the trouble with research programs in Government is this: When there is an emergency, a lot of money is given to research. As soon as the emergency is slightly diluted, money is taken away from research. Scientists and engineers and technicians are let out.

Then, some little emergency arises and then there is a little speedup in research, and then when that emergency is diluted, again there is a cut.

In other words, there is a stop and go and an up and down in research, and the scientists tell me that that is the very worst thing that can happen to research, that if you want good research, you have got to keep it steady, you have got to get a flow of activity constantly going, and that you cannot turn it on and off like lights or water.

Are you sympathetic with that?

SYMPATHETIC WITH PROPOSALS FOR EVEN FUNDING

Secretary McELROY. Yes; I have heard the same thing, and I have heard it from some of my friends in the academic world. And I am prepared to believe it and I hope that the thing can be kept on a good deal more even keel.

Mr. WEISL. I do not think that is a thing that is peculiar to the academic world. I think that is really commonsense.

Secretary McELROY. It is commonsense.

Mr. WEISL. It has got to be kept up. You cannot turn it on and off.

Secretary McELROY. That is right. It is not limited to the academic field. It involves industrial research activity, also.

Mr. WEISL. Another area where we have been told in testimony that was adduced was that of interservice rivalry. We have been told that the services, and not dishonestly but very properly, argue for their position in a particular area, and that that rivalry is not coordinated, is not resolved quickly enough. It results in the same thing that one finds where there is a collective bargaining going on in a labor dispute: that the rivalries tend to slow up production, slow up results, slow up development.

Have you looked into that, Mr. Secretary?

Secretary McELROY. I have, because it has been involved very specifically in the missile area. I felt pleased with the attitude that was taken by the two services who are working together on this IRBM deployment.

One of the reasons I put the paragraph in this statement was to show that the Army—this was done with the kind of spontaneity which I think would have pleased all of you on the committee—offered its help, not only in training personnel, but in any other way in which it might be helpful in connection with the deployment of the Jupiter or of the Thor, as far as that is concerned, despite the fact that it was well known to the Army that the Air Force would be responsible for this deployment.

There is no use in my saying there is not a good deal of rivalry among the services. That would require my not reading the newspapers and not living in Washington. I have done a good deal of covering of this subject with Mr. Holaday and Mr. Quarles before reaching the conclusion that we should not get into any change in the management of our current missile programs. I do believe that there has not been a delay in the development of our IRBM's, the Thor, and the Jupiter, because of the working of interservice rivalry.

I think you could really make a case that the interservice rivalry has speeded up the development of the two, because, as you well know in our competitive economy, a competitive spirit, if it does not run amuck, does something to stimulate people to strive toward a result more than if they do not have that competitive spirit driving them.

The thing that is needed, in my judgment, is not to kill the desire to be better and to do the best job in their services that they can do, but to keep that from bumping into a competitive—not a competitive, a censorious—point of view toward other services. We are working toward this.

I am not depressed about our being able to work something out that will make this make sense, and one of the reasons for organizing this advance weapons agency is in order to help some of this; in other words, to take one of these new weapons in its incipency or near incipency and take it for research and development out of the services into the Department of Defense, and then not assign it for deployment until the research and development stage has been complete, or very nearly complete.

I think my answer is: I do not believe that the missile program is actually being hurt. I think it could almost be defended, and I would be willing to defend this argument that it has been helped in terms of speed by the fact that there has been rivalry among the services. And, second, I think that there are adverse aspects of rivalry which we hope to modify as we move along.

Mr. WEISL. I am sure, Mr. Secretary, that you believe that, and I am sure that if there is any harm from interservice rivalry, you will do your best and will correct it.

However, we have had testimony by men, like General Doolittle, who have said that interservice rivalry, of course, to a certain extent, was healthy.

All competition to a certain extent is healthy. But when that competition becomes so intense that the services, instead of fighting the enemy, are fighting each other, that is when the trouble results. And these people get so persuaded of their point of view and so hot under the collar about it that sometimes the wheels of progress are stopped while they are fighting each other's viewpoint. And you have got to be the fellow and you have got to have the right advice so that you can settle these rivalries quickly and forcefully, or give someone the power and authority to do so.

In that connection, Mr. Secretary, we had two types of testimony. One was by Dr. Bush. No doubt you are aware of it?

Secretary McELROY. Yes.

Mr. WEISL. He recommended a war planning board.

Secretary McELROY. Yes.

Mr. WEISL. A board that would consist of independent career people who would be attached to no particular service, but who would have the duty of formulating war plans and procurement plans for the Secretaries, so to speak.

Have you given any thought to that recommendation, or have you any views on it that you would like to express?

OPEN MIND ON PENTAGON REORGANIZATION

Secretary McELROY. I would not like to express views, because this is one of the suggestions that has been made as to how we might make more effective the working of the Department of Defense.

It certainly is one of the proposals that will be given consideration as we rather deliberately look at ways in which we might better organize the Department of Defense to give us what we are trying to buy.

I have heard rather convincing opinions to the contrary on that particular point, but I am not trying to render judgment at this time. And as far as I am concerned, my mind is quite open, because I also see virtues in what Dr. Bush has recommended.

Mr. WEISL. And General Doolittle, whom I am sure you know and respect, said that, based on his very wide experience in the military, and his service on various important commissions appointed by the President, what you need most is an advisory board in the nature of a general staff, consisting of young officers who are dedicated only to one thing, and that is the defense of the United States, and who would be your advisers, so that when the Joint Chiefs of Staff come to you with a decision or with an opinion, these men, who haven't any of the individual services at heart, but only the service as a whole at heart, could advise you without fear or favor, without prejudice in favor of any service, as to what your position ought to be.

He thinks that that would serve as great help to expedite the performance of your duty in this time of crisis.

What do you think of that?

Secretary McELROY. I, of course, wholly respect General Doolittle and his views. I am sure that he would be among the first to say, however, that the discovery of an officer who has gone through his career in one or another of the services and who can submerge his interests in that service to such an extent that he can be completely objective with respect to the various services is something which will be rather difficult to discover.

Mr. WEISL. I am sure we have felt that way, too.

Secretary McELROY. It may be worth trying.

Mr. WEISL. But we felt—when I say “we,” at least I felt, and I think the chairman felt, and I am sure some of the committee felt, that if these young officers made a career of it—that is not what General Doolittle said, but if these officers, these young officers who were able and smart and shrewd and dedicated, knew that their career would be in that particular service, and that they would not have to go back to the Army, Air Force, and Navy, their promotion would be in that career, in that service, looking only toward one object, getting the best weapons, the best defense for the United States of America, that that might be of the greatest service to the Secretary of Defense. Today we are advised by people who subconsciously might have in mind—and they believe, of course, it is for the good of the country—

but they have in mind their particular service. We have talked to each of these services, they are all wonderful people, they are all dedicated people, patriotic people, but they all believe that what they want for their role and mission is the right thing for the country.

They must be biased and they must be prejudiced for their own service.

General Doolittle thinks that if you had somebody to lean on who was not attached to any service, that might be of the greatest help to you.

I am sure you will study that or get someone to look into that and study that carefully, and see if that might not help you expedite this.

Secretary McELROY. We would like to accept the suggestion that it be explored along with other plans for improved organization of the Department.

Mr. WEISL. Mr. Secretary, I hope I have not unduly burdened you by my questions. We are trying to explore the facts to get every possible bit of evidence to help the committee, really to help you and to help the country.

Now, if there is anything that I have not asked which you think ought to be answered, or anything you think you would like to say, I wish you would say it now.

Secretary McELROY. I have no other comment, Mr. Counsel.

I will say again, to me, all of the questions you have asked have been quite appropriate, quite fair questions. I hope that my answers have helped some in establishing the record.

Mr. WEISL. They certainly have.

Thank you very much.

Mr. Chairman, that is all I have to ask.

Senator JOHNSON. Thank you, Mr. Counsel.

STEPS NECESSARY IF WE ARE TO BE EQUAL OR SUPERIOR

Mr. Secretary, the committee is aware of the fact that you are new in your job, but I want to ask you this question: What, in your opinion, should be done first, and second, and right on down the line, to assure our equality or superiority in the missile-satellite fields?

Secretary McELROY. We have authorized one move today which seems to be necessary in order to advance the date of our having operational missiles within the reachable distance of our principal enemy.

Senator JOHNSON. Without passing judgment on the wisdom of the decision, I congratulate you on the fact that a decision has been made.

Secretary McELROY. We will have to take the responsibility for the decision, and are quite willing to do so.

I would believe, first of all, that we should keep our retaliatory force in the air—I am talking about aircraft now—available to retaliate on whatever speed of response is required to meet whatever weapons are opposing us.

That means that we will have to increase the speed of our response, which means speed of alert time on the Strategic Air Command and speed of alert time on those attack plans which are based on aircraft, and so on.

The dispersal basis of the Strategic Air Command, I think is called for in this kind of a situation in order to not have too many of our principal retaliatory forces concentrated in a relatively few fields.

I think that we are going to want to make an investment in improved detection devices for the new types of enemy weapons which we may face in the future.

I think that we need to move forward as rapidly as is reasonable. When I say "as is reasonable," there is a great deal that we need to know technically in this area toward the development of antimissile missiles.

I think we need to pursue an active program in the various satellite fields which we have been exploring, some of which seem to have very definite and special interest to the country.

While the IRBM deployments that we have considered as being of urgent importance now to the country should be pursued, not only in the land-based but also in the sea-based types, the Polaris types, with the submarine deployment, I feel that we should obviously move right along in our test program and in our preparation for deployment of the intercontinental ballistic missile.

Senator JOHNSON. Are you making a reassessment of the ICBM?

Secretary McELROY. We are making a reassessment of the ICBM.

Senator JOHNSON. Are you making any reassessment of the anti-missile missile?

Secretary McELROY. Not at this point, but we are pursuing a very active testing program which is about as far as we can be with that one.

Senator JOHNSON. I don't want to interrupt you but you are making very constructive suggestions and this is what the committee is looking for.

Secretary McELROY. This is the kind of thing that has gone beyond my thinking about it here. These are things that we really plan quite definitely to include among our recommendations.

Senator JOHNSON. Have you given any thought to increasing the retaliatory power of the Army and Navy along with the Air Force?

Secretary McELROY. We think of the Polaris as being retaliatory power of the Navy.

We think of the Army as being not so much in the retaliatory, but in the occupation of ground kind of situation by posting forces on the ground.

We certainly are working and we plan to continue to pursue the subject of improved capability of our ground forces, both the Army and the Marines.

I think that with those specific exceptions, I can just fall back again on my belief, Mr. Chairman, that if we are successful in the Defense Department in setting up an agency for the successful prosecution of our research and development on advanced weapons of all types as they come along, we will have made a very major step in protecting ourselves against any loss of position. The thing that is important, in my judgment, is that we do not lose ground in relationship to an important world competitor in this weapons field.

Senator JOHNSON. And this committee can understand and through this committee the country can be assured that you and your associates who are the trustees of the defense of this Nation are going ahead to expedite plans for research and development that will put us ahead of the Russians?

SATISFIED WITH QUALITY OF ASSOCIATES

Secretary McELROY. Those are our plans, and I am sure I speak for my associates for whom I have great admiration both in the civilian and in uniform. I am glad that Mr. Weisl spoke of that because it does seem to me that the quality of people I found among my associates down here has left very little to be desired.

Senator JOHNSON. I wonder if you would take the time to organize as compactly as you can and as briefly as you can so when we meet later perhaps in either open or closed session, you can bring us up to date on the stage of development of your plans to put us out in front in research and development and at least give the committee some of your thoughts in that connection and some of the steps that you are taking or plan to take?

Secretary McELROY. All right.

Senator JOHNSON. By making a maximum effort, Mr. Secretary, in doing all that we can and as soon as we can consistently with the limitations with which we are all familiar, how soon do you think it is going to be before we can catch up with the Russians in the overall missile field?

Secretary McELROY. My problem in this is that I do not know how fast they are going to go.

Moreover, I have no assurance that they are ahead of us, Mr. Chairman. I have read what Mr. von Braun has said, and he also I regard as a very excellent man, but whether he knows positively the things that he said there I don't know.

If he does I think he has knowledge that we don't have.

I mention him only because he is one who has spoken out quite broadly in this general area.

Senator JOHNSON. I know though from the extensive briefings that you must have had that you certainly have little reason for great satisfaction and complete and absolute comfort.

Secretary McELROY. Little reason you say?

There is no question about that. I will say at every stage that my position in relationship to our program here should be based on an assumption that we must catch up.

I must say at the same time that I don't know positively that that is what we are up against.

But the timing is something I think I cannot quite have a judgment on.

GUIDELINES SET NO CEILING ON EXPENDITURES

Senator JOHNSON. Mr. Secretary, now in the budget that is presently being prepared in the Department of Defense, has any ceiling been set on expenditure?

Secretary McELROY. There was no ceiling set. The ceiling was set—the word is wrong as I have used it.

The amount that will be set will be set based on a combination of needs under an original group of guidelines, but supplemented by high-priority items to the extent that they were recommended by the Department of Defense—and a great many were—and that they were concluded in consultations with the administration.

Senator JOHNSON. Who set the guidelines?

Secretary McELROY. The guidelines were set by the Secretary of Defense.

And in my judgment that is the best way to begin a budget. I would be for that, because you at least have some figures that people have to put their minds to staying within. But if you do not freeze it there, if you then say, "Now, to the extent that you have great conviction that there are high-priority items that are not includable in that figure, we will consider those recommendations."

And that is what we have done. We have chosen high-priority items. We have also put a squeeze on what looked like lower priority items in an attempt not to take this thing too far beyond what seemed sound and right in other ways.

Senator JOHNSON. Can you give us the general target in amount, the guideline?

Secretary McELROY. The guideline as originally set was \$38 billion. But that is not the figure that will be the end figure because of our belief and the belief of the administration that there are high priority additions that should be included beyond that figure.

Senator JOHNSON. Do you expect it to be increased appreciably?

Secretary McELROY. I have been saying right along it all depends on what you mean by the term. I feel—

Senator JOHNSON. How much can we expect it to be increased?

Secretary McELROY. Moderately is what I have said.

Senator JOHNSON. Moderately?

Secretary McELROY. Yes.

Senator JOHNSON. And what would "moderate" mean to you?

Secretary McELROY. If you do not mind, Mr. Chairman, I would like not to be asked to give the figure. I think it is a little premature in offering the President's budget figure at this time, but the principal answer I would like to give is to your question as to whether there was any ceiling set, except the Defense Department recommending what it regarded as priority programs for the defense of the country, and my answer to that is "No."

DOES NOT CREDIT THE RUSSIAN BOAST

Senator JOHNSON. How seriously do you take the Russian boasting about having complete supremacy in the event of war?

Secretary McELROY. I do not take it seriously at all because I do not believe it for 5 minutes or for 1 minute.

Senator JOHNSON. Thank you, Mr. Secretary. That is a good place to end the questions.

Senator Bridges.

Senator BRIDGES. I have no questions at this time.

Senator JOHNSON. Senator Bridges, if you will pardon me, may I ask one more question I overlooked?

Did you read the five-point priority program recommended to this committee by Dr. Teller? Could I review that to you and get your comments? Dr. Teller recommended that we:

(a) Maintain and improve our SAC defense. The manned bomber is not now obsolete and will not be obsolete even when we have an ICBM. The most logical first step is dispersal of planes.

(b) Try to accelerate and expand the missile program.

(c) Study and initiate and probably inaugurate an adequate passive defense program.

(d) Attempt to accelerate the production of nuclear-powered submarines in number.

(e) Start now on a better program for science education.

Would you generally embrace those suggestions?

Secretary McELROY. I remember now reading those in the paper exactly as you have given them and I felt that the way Dr. Teller recommended this country's defense was essentially something that we could accept. I believe he did recommend a substantial shelter program; is that right?

Senator JOHNSON. Yes; that is under your passive defense. I do not want you to dot every "i" and cross every "t." I just ask whether you believe those suggestions for priorities given by Dr. Teller are constructive and worthy of serious consideration by the executive and by the Congress?

Secretary McELROY. I felt that way when I read them and I feel that way now.

Senator JOHNSON. Fine, and we would certainly express the hope that you would review the testimony of the other witnesses carefully in the hope that by all of us working together we can improve our common defense.

Secretary McELROY. Thank you.

Senator JOHNSON. Thank you, Mr. Secretary. I appreciate the candor and frankness of your answers and your courtesy of replies.

Senator BRIDGES. I have no questions. I am delighted, Mr. Secretary, that you have started to make decisions even though you are new in the office and am glad to see this decision today relative to the Thor and the Jupiter. I just hope that with the seriousness of the situation your program will be such that you will continue to clear up some of these roadblocks and we will get action as quickly as possible on this whole series of subjects.

Secretary McELROY. We are receptive to just that kind of action. The kind of thing that I regret here, as I have said before, is these urgent programs cannot go through what you might call a normal kind of testing and development which would let you make a decision that would be tighter than the kind of decision we have made today. But as has been suggested before by your committee and by others, the judgment decision sometimes has to be made in the interests of the country, and those decisions are usually more expensive than if you were allowed the time to go clear down the road. That kind of thing is done in business every day. These are a good deal more expensive to the public, but we are also playing for a good deal higher stakes, so that I guess if you can do it in business you probably have to do it from time to time in the defense.

Senator JOHNSON. Mr. Secretary, who will make the Thor and the Jupiter? Who are the contractors to make them?

Secretary McELROY. Douglas makes the Thor. Chrysler, the Jupiter. It is a combination of Chrysler and the Ordnance Department itself.

Senator JOHNSON. Is there anything you can say in open session about the approximate estimated cost, additional cost of this decision?

Secretary McELROY. I would rather hold that, if I may.

Senator JOHNSON. You would not want to say about the estimated number to be made, the time taken? You would rather do that in closed session?

Secretary McELROY. I would rather hold that one because it is to some considerable extent dependent on agreements to be made with our allies and with NATO, because as you understand, the deployment of these is not within our boundaries; and for that reason, the decision could not be ours.

Senator JOHNSON. Senator Byrd.

Senator BYRD. Thank you very much, Mr. Chairman.

Mr. Secretary, I am very happy to have you before the committee today.

Secretary McELROY. Thank you.

CONGRESS APPROPRIATED \$1½ BILLION OVER REQUESTS

Senator BYRD. Your testimony has been enlightening and very frank. I know you have made the same impression on every member of the committee as you have made on me.

Mr. Secretary, for the purpose of the record, I am going to read some figures on appropriations which indicate to me that the serious deficiency in our military establishment in the missile field cannot be attributed to the failure of Congress to provide adequate funds. In the past 4 years, through fiscal year 1957, Congress actually appropriated \$1.5 billion more than the present administration requested for the military. I assume you will agree with me that period was the most critical period perhaps in the missile development? Am I correct about that?

Secretary McELROY. I do not know what was the most critical period, Senator Byrd, and I am not trying to duck the question. Mr. Von Braun says it goes back to really right after the war, the entire period.

Senator BYRD. It certainly was critical.

Secretary McELROY. Certainly the years that you are talking about were some of the years that were critical.

Senator BYRD. I want to make it clear, I want to say this, Mr. Secretary: that if my figures are in error, I would be very glad to have your staff make a corrected statement for the record.

Now, the military departments entered the current fiscal year 1958, which began last July 1, with a total of more than \$75 billion appropriated for their expenditure—\$35.4 billion in new appropriations and \$39.7 billion in unexpended balances. Of these old balances, \$12.9 billion were still unobligated.

The Air Force had \$19.4 billion in unexpended balances for the year beginning July 1, and \$5.8 of these old balances was still unobligated. With its \$16.8 billion in new funds, the Air Force entered the year with a total of \$36.2 billion of which \$22.6 billion was not then obligated.

The Navy had \$12.7 billion in unexpended balances when the year began July 1 and \$4.3 billion of old balances were still unobligated. With its \$10.2 billion in new funds, the Navy entered the year with a total of \$22.9 billion of which \$14.5 billion at that time was unobligated.

The Army had \$7.3 billion in unexpended balances when the year began July 1, and \$2.7 billion of these old balances was still unobligated. With its \$7.7 billion in new funds, the Army entered the year with a total of \$14.9 billion, of which \$10.4 billion was unobligated.

And in the past year, Mr. Secretary, as you are probably aware, the appropriations enacted by Congress for the current fiscal year, totaled practically precisely the amount Secretary Wilson in his letter to the Conference Committee on the Military Appropriation bill said was necessary. I, of course, do not expect you to absorb all these figures from my reading of them to you, but I think it is important in endeavoring to ascertain the cause of the fact that it is admitted we are lagging behind in the missile-development field, it is important to make it clear that these appropriations were made by Congress; and that in a 4-year period totaled \$1.5 billion in excess of the requests by the President.

I am not asking you to comment on that now unless you desire to do it, but I would appreciate it if you would have these figures checked if you desire to do so, and if there are any errors I would be glad to see a statement inserted in the record.

Secretary McELROY. I will have the figures checked at your request, Senator Byrd, and other than that, I would like to reserve comment, if I may.

Senator BYRD. I have nothing further.

Senator JOHNSON. Senator Saltonstall.

Senator SALTONSTALL. Thank you, Mr. Chairman. Mr. McElroy, the purpose of this committee, as I see it, is twofold, perhaps threefold—(1) to acquaint the people of our country with the present status of our defense and what we should do about it, (2) to stimulate administrative changes and improvements, and (3) to consider any possible legislation that might come out of these hearings.

Now, I think the chairman of our committee and the counsel have brought out the purpose of the meeting very clearly, the enthusiasm that we want to stimulate in the Department of Defense, and I think counsel has analyzed some of the problems that you face.

Now, I would like to ask you just 2 or 3 questions along the lines of legislation.

In the first place, this is simply to clarify what the chairman asked. You mentioned \$38 billion in the guideline. You did not say whether that was new appropriations or expenditures. Could you just say which?

Secretary McELROY. We took \$38 billion of new appropriations and \$38 billion of expenditures both as guidelines. Now, they could not exactly coincide, but the guidelines included a common figure for both.

Senator SALTONSTALL. You stated, I think, if I heard you correctly that it might be advisable for the Department of Defense under you to have control of the total research and development fund, and then turn it over to the services for production. Did I hear you correctly?

Secretary McELROY. That would only be in the area of what I would call the advance weapons agency, and those would be at this particular time limited to the antimissile missile and to various satellite applications of a military nature.

Senator SALTONSTALL. Now, along those lines, some of us here are on the Appropriations Committee as well as the Armed Services Committee. In thinking this problem over last night I recalled that the emergency fund of the Secretary of Defense in 1955 was \$25 million. In 1956, it was \$35 million plus the authority to transfer to

the emergency fund \$50 million from any other account at the discretion of the Secretary of Defense.

In 1957, it was \$85 million plus the same power of transfer of \$50 million. And in 1958, the current fiscal year, it was \$85 million plus the authority to transfer \$50 million more. It seems to me that it might be very advisable in connection with your budget, if you did not want to get into higher funds, to cut down some of the research and development money that is specifically allocated to the various services.

We had last year, for instance, \$1.4 billion, and put a bigger amount under the control of the Secretary of Defense. What do you think of that?

Secretary McELROY. I think that will be recommended, particularly, Mr. Saltonstall, in the area of antimissile missiles, where there have been budgets supplied for activities in the past few years within the services. Now, we plan that those amounts will be requested in the new budgets for the Secretary of Defense, for the Office of the Secretary of Defense, instead of to those services. So, the thing that you are suggesting we do plan to move on.

Senator SALTONSTALL. Why should you confine it just to those two missiles? It seems to me that, if there was a bottleneck, or if one project ran out of funds or something of that kind in this situation which we find ourselves in today, would it not be better to give the Secretary of Defense more balances to work with?

FLEXIBILITY IN MOVING OF FUNDS WOULD HELP

Secretary McELROY. We would always like, if the Congress were willing to authorize this, we would always like to have greater flexibility in the moving of funds, the transfer of funds from one kind of an activity to another. I have been discussing this with our people, and I found that there has been some reluctance on the part of the Congress to do this to the extent requested. But we do plan to bring that subject up again, also, partly as a means of helping us to finance the accelerated production of IRBM's that we have announced today. But we will have to come to the Congress early in January, certainly, to request authority for construction of bases, which requires specific authorization, and we will probably have to come, also, to request transfer of authority from one type of appropriation to another, which is not permissible under our broad authority, and perhaps even to request new money. But the possibility of our having a more general authority to transfer money from one part of the Defense Department to another is one that is most attractive to us, if the Congress will give us that much flexibility.

Senator SALTONSTALL. My own personal feeling on that, I must add, is I think our Appropriations Committees are very much less willing to transfer funds between appropriations after we have gone into the appropriations and justification than to give larger ones to the original purpose. That is why I brought it up, because it seems to me you could help a lot of these problems if you had the money in your own discretion, under Mr. Holaday's advice, to put into your various critical areas.

Secretary McELROY. I would like to pursue that suggestion, and we do welcome it, Senator.

Senator SALTONSTALL. Now, the counsel, Mr. Weisl, questioned you at some length on the subject of Mr. Holaday's working relation with you. Is my understanding correct when I say that you have the power today, as Secretary of Defense, to tell the Secretary of the Navy, we will say, to make a certain contract or to break a certain contract? Do you interpret your authority that far?

Secretary McELROY. I would have authority to do that. I think, as a practical matter, I would be very unlikely to do this. This is a question that was brought up, as you probably remember, in consideration of a candidate for a position as Secretary of Defense. In other words, this is under the conflict-of-interest statute. There is no question, in my understanding, that he has the authority to have a contract made, but I think, as a practical matter, it would be the kind of thing which you would be very unlikely to say, "I order, I instruct you to sign that contract with the Douglas Aircraft Co. or with Chrysler or with any particular company."

I think it would be the kind of thing that, if you have a qualified man running one of your departments of the Defense Department, you would expect him to proceed once there was a general decision as to policy.

Senator SALTONSTALL. The counsel discussed the powers, as I say, that Mr. Holaday had, and, as I understand it, you have given Mr. Holaday all the power that you have in connection with these missiles subject to your guidance.

Secretary McELROY. Right.

Senator SALTONSTALL. Now, am I correct in my understanding of the ordinary procedure? The Secretary of Defense, as you say, makes no contracts himself. Mr. Holaday would make no contracts, but he would say, for instance, on the Jupiter, to the Army that the Jupiter should proceed, that the Army should proceed with more research, or to pursue it at an operational level, which you have done? That means that the Army Secretary, upon the advice of his research man, and out of his research money, makes the contract; am I not correct?

Secretary McELROY. That is correct.

Senator SALTONSTALL. And he sees that that contract is fulfilled. Now, assume that that contract is going in a way that is not satisfactory, or is lagging. How far have you given Mr. Holaday the power to interfere with that, to correct it, or to change it?

Secretary McELROY. Mr. Holaday follows the progress of such a contract. He would be very likely to do it with the Research Director or Research Assistant Secretary of that service. He would do it by visiting the installation at any time he wishes, without any hindrance on the part of the service permitted or even suggested, and, if there were any slowing up, he himself would suggest ways in which the slowing could be corrected, and then, if some action were needed by the Department of Defense, he would bring it to me.

Senator SALTONSTALL. So, just to carry that one step further, if there was a difference of opinion between the Research Secretary in the Department of the Army and Mr. Holaday, as your missile expert, and they disagreed, what procedure would be followed there?

CHANGE IN LAW NOT REQUIRED

Secretary McELROY. Of course, what we try to do is settle those things without bringing them to the Secretary, but, if there were a conflict which was irreconcilable on this point, it would be brought to the Secretary.

Senator SALTONSTALL. So that, for all intents and purposes, you do not need, in your opinion, a change in the law on this subject? It is a question of administering the present law satisfactorily?

Secretary McELROY. I do not think we need any change in the law. I was informed, as to my proposal for a single manager, that there is authority for such employment under the law. However, I do have an obligation, I am told by our Counsel, to notify the Armed Services Committee of the Senate and the Armed Services Committee of the House if and when we determine to take this action.

Senator SALTONSTALL. If and when you determine to take action?

Secretary McELROY. Take this action.

Senator SALTONSTALL. Oh?

Secretary McELROY. On the appointment of a single manager of an advanced-weapons agency. But it seems clearly to be within the authority of the law as it now is written.

Senator SALTONSTALL. Then within your brief time in the Department, and subject to careful reflection, you know of no changes in the law that are presently enforced that you would recommend to accelerate missile research and development?

Secretary McELROY. That is correct.

Senator SALTONSTALL. And any changes in the law would come in connection with this military planning advisory board that Dr. Bush and General Doolittle—

Secretary McELROY. This is of a far more broad nature, and there I would say I am sure that you gentlemen would want to consider along with us after we had reached a conclusion in the matter and at considerable length, because it involves the degree of change which I think you approach with very real respect and hesitation up to a point of decision.

Senator SALTONSTALL. Just one more statement and question. I was informed—I forget whether I heard it in testimony or heard it somewhere else—that actually the overtime order issued by your predecessor did not interfere in any way with research and development. It did interfere somewhat or a little in production before it was repealed; is that correct?

Secretary McELROY. Let me consult. I believe that is correct. I am informed that while the limitation applied generally, that there was a limitation on the research and development programs on these missiles, these high priority missiles but—and I am talking now on the IRBM and ICBM's—for the agency involved could request relief if that relief of overtime would accelerate the development of the research and testing program on the missile; so that we have a belief in the Department that the overtime restrictions that were put on did not actually deter the proceeding with the research and testing program on the missiles on the most rapid basis that technical knowledge would permit. That is our belief.

Senator SALTONSTALL. But did it interfere with production?

Secretary McELROY. To some extent we think it did.

Senator SALTONSTALL. Mr. McElroy, might I just say, in conclusion, I hope you will give very serious consideration to, we will say, a substantial increase in this emergency fund for the Secretary of Defense, even if it results in somewhat of a reduction in the research and development funds of the individual departments, because it seems to me that that is one place where we can accelerate quickly, because it gives you the opportunity to cut a certain amount of red tape and make a quick decision.

Secretary McELROY. That is right, it does do that. As a matter of fact, some of the money this year was used for the purpose of moving along, authorizing continuation of the Jupiter program, and that as you can see has been what seems to be up to this time advantageous development in the interests of this country.

Senator SALTONSTALL. Thank you very much, Mr. Chairman.

Senator JOHNSON. Senator Kefauver.

Senator KEFAUVER. Thank you, Mr. Chairman.

Mr. McElroy, I want to compliment you—and I am sure other members of the committee would join in that—in the grasp you seem to have gotten of the Defense Department in such a very short time, the frankness with which you have answered these questions.

I might say, Mr. Chairman, that you and I have been in the House and Senate and in my experiences this has been one of the most important, if not the most important, hearings that I have ever been present at. I think it is a great public service to have it so well organized by our counsel, but you and the witnesses have certainly cooperated. I think it will be helpful to us in Congress and the public and to the Executive, too.

Senator JOHNSON. I want to express my appreciation to the Senator from Tennessee. He has had a wealth of experience in the investigating field. I appreciate very much his remarks.

Senator KEFAUVER. I have conducted different kinds of investigations, Mr. McElroy.

Secretary McELROY. I hope I do not have to come up before you in connection with one of those.

Senator KEFAUVER. I hope I do not get into any more, but I am sure you would not be one of the witnesses.

Mr. McElroy, one thing that worries me about the setup you have in the Department of Defense is that—

Senator JOHNSON. Mr. Secretary, would you pardon me? I am going to ask the vice chairman, Mr. Stennis, to preside. I have been asked to come to a meeting at 5 o'clock and I will rejoin you just as soon as I am able to return.

Thank you, Senator Kefauver.

Senator KEFAUVER. The Department of Defense is interested, of course, in the military aspects of the missiles, satellites, space, and whatnot to the practical exclusion of just civilian aspects, is that correct?

Secretary McELROY. Yes. Our responsibility on the civilian aspects of satellites involves whatever decision another agency of Government wishes to make with respect to using us.

In that case, we are glad to offer our services if we can be helpful, but we do not consider that it is a responsibility of ours to initiate in that field.

Senator KEFAUVER. You do not consider it is your responsibility to initiate something in the civilian field, but if you have an assignment by law you would carry it out?

Secretary McELROY. Oh, yes, of course, and we are doing so.

JOINT CHIEFS ADVICE IS WEIGHTY

Senator KEFAUVER. In answer to Mr. Weisl's question as to what would happen if one of the services developed a new and improved weapon or type of missile, or thought they had developed one or had an idea for one, you said that the service would bring the matter to Mr. Holaday and he probably would talk it over with you, and then it would be referred to the Joint Chiefs of Staff to see whether it is militarily worthwhile or not, and if you found it was, and it was otherwise feasible, why, then it would go ahead.

But what if it is blackballed or turned down by the Joint Chiefs as not being of any military benefit? Would that stop the development there?

Secretary McELROY. Not necessarily, but I would say that it would certainly slow down the project, because we do look to the Joint Chiefs to advise us—this is by statute—as to the military necessity of weapons.

Senator KEFAUVER. We have been told, rather, there is information to the effect, that one of the reasons why we have gotten behind in satellites, for instance, is the Joint Chiefs and some people in the Defense Department just did not see any military importance in the launching of satellites. It was not considered to add anything to the military strength, so that emphasis should be put on something else.

Is that the kind of thing that we are going to continue to run into with this kind of operation you have, it having to be approved by the Joint Chiefs before you go forward?

Secretary McELROY. I do not believe that that conclusion was reached by the Joint Chiefs, Senator Kefauver, because there has been a great interest for some years in a military use which we can discuss later about a reconnaissance satellite that has been in the press, and I see no reason why it should not be mentioned.

There are expected to be other extreme uses of various kinds of space vehicles, and while we have not considered that we had a responsibility for the IGY from an initiation standpoint, only as an agent, nevertheless we have felt the responsibility and do feel the responsibility for any kind of military weapon development, no matter in what field it may reach so far as civilian use is concerned.

Senator KEFAUVER. The evidence is preponderant, Mr. McElroy, that in the military department there was not top priority put on the development of the satellite. And that is the reason the Russians got theirs up first. And I just wonder how you are going to prevent that kind of thing from happening again in such an important field of activity.

Secretary McELROY. I think that the type of satellite that the military was interested in required development which went way beyond the kind of instrumentation that is considered right for the IGY satellites.

I think, though, that my answer to your question is that I feel the necessity of the thing that you are talking about, which is that we do

not fail to recognize early in the game the importance of some very novel kinds of weapons which some people are sometimes likely to brush off as Buck Rogers stuff. One of the things that we are hopeful we will accomplish by creation of this advance weapons agency is that we will have a part of the Defense Department on whom the responsibility will rest for bringing to the Joint Chiefs and to the Defense Secretary's Office the potentialities of very far upstream types of weapons possibilities.

Senator KEFAUVER. Mr. McElroy, I do not believe that all of the satellite and space operations come under the term "weapons." I was very much impressed with Dr. Teller's testimony. He pointed out clearly that there must be basic research of a scientific nature—whether of going to the moon or to Mars—which has no immediate military applications.

Under the Defense Department where the primary consideration is given to weapons, is there going to be sufficient emphasis put on this kind of scientific research?

Secretary McELROY. I think that within Government, there may be some doubt as to which of the agencies is responsible for this kind of thing until it becomes apparent to the military there are military possibilities in it; and I do not mean that there should not be men who should be thinking, in the military department, about the possible application of some of these new kinds of thinking.

But it is true, as I am sure you know better than I do, Senator, the National Science Foundation and the Atomic Energy Commission and a number of areas of Government activities now have responsibility in this field. I think one of the real contributions that Dr. Killian can make, and I believe he intends to make this contribution, is to see whether there cannot be some improved coordination of the research activities in these various parts of the Government.

There is some now, but I think that it is possible to make improvements.

For example, the NACA, in aeronautics, do a lot of work which is of importance to the military.

Senator KEFAUVER. Mr. McElroy, if you do not consider experimentation in missiles, or that might have something to do with the control of the weather, going to the moon on purely scientific adventures, primarily military matters, there must be some coordination so that there will be sufficient importance given to these other features by some other agency of the Government.

"UPSTREAM" RESEARCH INDISPENSABLE

Secretary McELROY. I think so. I think what you are suggesting falls in the areas of upstream research which could be called basic research or most any kind of term you wish.

I will say in this country we cannot afford to overlook these things, and many of these will be undertaken by the Defense Department, because they seem pretty obviously to be military potentialities.

But even if there were not, in my opinion, there should be, a Government interest in exploring. I might have an example for you.

The President, in his talk in Oklahoma City, mentioned the need for investment in a couple of accelerators. I cannot do much in explaining that to you, except I do know that these accelerators that

are proposed are things which look as if they may give us some additional secrets of life, but without any specific ideas as to what they might tell us.

There has been a proposal that the Defense Department share in the financing of those, along with a couple of other agencies of Government, so that there is some coordination of a thing of that sort, although I think it could be formalized.

Senator KEFAUVER. Well, there is so much scientific development and research of tremendous importance going on, some of which might be military, some nonmilitary, but would all improve our standard of living, our protection, our future as a nation, and there has to be some coordination somewhere in all these efforts; is that correct?

Secretary McELROY. I would agree, and I think that out of the work of Dr. Killian, we may very well find that is going to come.

We could very possibly take some positive action in encouraging that ourselves. I feel confident that could be.

Senator KEFAUVER. Are you in position to state whether you think there is any merit, or would you rather reserve that to further consideration in executive session, in the idea of a Secretary of Science who would be a coordinator of all of these applications?

Secretary McELROY. I do not see any reason why I could not comment here, except I really have not given it very careful consideration, Senator Kefauver.

I have been somewhat lax in thinking about other departments of Government because of the occupation with this job; but I would feel that some type of coordination, whether it requires a Cabinet secretaryship, I do not know, but I think it is something that is quite appropriate to bring up right in this session. We like to think about how we might be more active in it.

Senator KEFAUVER. That is apparently a situation in which Dr. Killian has no authority.

Secretary McELROY. That is correct.

Senator KEFAUVER. One further question, and I have taken too much time.

We talk about interservice rivalry, but some scientists have testified here and have told us privately that one of the difficulties has been that rivalry has gotten so intense that in one segment of a service they are reluctant about exchanging information with scientists in another service; that corporations having contracts like to keep that information to themselves, protect their patent, to protect their trade secrets; that there has not been the general freedom of discussion back and forth even in a particular service, in the different units working on some scientific missile development, and certainly not as between the units and not as between the people who work for the various companies.

It is understandable how that has come about, but have you found that to exist? And, if so, I assume you can correct whatever deficiencies there may be.

IT WOULD TAKE A SMALL MIND TO WITHHOLD INFORMATION

Secretary McELROY. Well, I hope you will ask Mr. Holaday about how much of that he has found. I am sure there is some. I think it is a very small mind that would do that within the Government.

I think we do not have as many of them as I believe a good many people have been led to think. But I think it should be regarded with impatience wherever you find it, and it should not be tolerated. The problem with the corporations who are contractors under these programs, I think, is a more difficult one. I think that within Government, there should not be any of this permitted, and it should be stamped out, when found.

But I think, where you get into such things as patent questions and that kind of business, it becomes more complicated, and I do not quite know what to do about that one.

But I would think there that whatever knowledge would be developed by a contractor would become the knowledge of a service that was working with the contractor, and that knowledge then, when brought back into the Defense Department, if there were free interchange there, should be available to the other services.

Senator KEFAUVER. All right. Thank you, Mr. McElroy.

Senator STENNIS (presiding). Senator Case?

Senator CASE. Thank you, Mr. Chairman.

Mr. Secretary, I want to join with what has been said in appreciation of the candor and the frankness with which you have spoken this afternoon.

Secretary McELROY. Thank you.

Senator CASE. There were some areas in which you disqualified yourself from knowledge, but, so far as you could, within your knowledgeable experience, you have not hesitated to speak frankly to the committee, and that is what is certainly helpful.

I also want to express appreciation for the answer you gave Senator Kefauver a moment or two ago with respect to the possible interest of the Defense Department in some of these long-range research matters, such as weather modification.

Perhaps you know, and perhaps it has not come to your attention, but the work in weather modification really proceeded as a military project, originally, when the General Electric people were asked to consider ways of creating camouflage with smokescreens and things of that sort, and that led them into a study of what made it possible to maintain particles in the atmosphere or what kind of nuclei responded to certain chemicals or treatment.

That led to the Langmuir and Schaeffer experiments, which was the start of weather or cloud modification.

However, in recent years, I have had the feeling that military branches seemed to shy away from work in that field. They generally had observers in congressional hearings, but they generally hesitated to express direct interest of the services in this field.

The suggestions that have been made before this committee by Dr. Teller and others in the last few days, and your own response, lead me to think that perhaps we will not entirely abandon research in a field which has such ultimate possibilities, and I hope that the Defense Department will not hesitate to support the legislation which the Senate has already passed, and which is now pending in the House, providing for a program of research under the direction of the National Science Foundation.

The second topic I want to discuss briefly with you has to do with this problem of incentives for speeding up production.

I do not know to what extent your business experience led you to deal with renegotiation, but one of the primary purposes sought in the establishment of the renegotiation procedure was this very purpose of making it possible to pay different producers different rates for the same article in order to provide incentives for them to change over from the production of something in which they had been customarily engaged, and switch over to the production of what they had no experience whatsoever with, no price experience, something new which the Defense Department, or the Department of War and the Navy, as it was in World War II, had no price history to guide them in the letting of firm contracts.

If renegotiation has been prostituted or poorly administered, even, in some respects, so that it has failed to allow incentive payments, then that is the fault of the administration, I would say.

The problem that we had when we were working out the renegotiation procedures in World War II was, to a certain extent, the exact problem you now have, and that is, of expediting production, of getting changeovers in plants, and in developing new models or new devices where there was no cost experience.

We had to encourage speed. We could give letters of intent, but we also found that the Supreme Court pointed out in the Shipbuilding case that these unconscionable profits, when made, were discouragement to the selling of bonds and the stimulation of the war effort as a whole.

So, the renegotiation was devised as a means of protecting the public purse, and not the pricing of the defense articles so high that our dollars got less and less production, but to make a fair profit.

We had also the problem that some plants were producing on their own, with their own plant. Other plants were using Government-invested capital, Government-built plants, Government-provided tools, and the ordinary tax laws which were based upon a percentage of profit would apply inflexibly to the plant which was producing with Government-supplied capital, plant, and tools, as well as to the plant which was using its own capital.

So, the renegotiation procedure was developed to make it possible to encourage production of essential materials by both types of plants, and yet have a fair profit.

I certainly join in what counsel has said and what the chairman has indicated—we want the expediting of the production program. But, if you will pardon me, we must also remember that there are other committees besides this committee, and in the past we had a committee known as the Truman committee at one time, and yet it was shown to the country that sometimes there could be bonuses that were unjustified when you looked back over them.

So, I hope that, in your study of incentives, you will find time to go into the renegotiation procedure as originally conceived. If it has got some bugs in it, why, straighten them out.

But it was designed to provide incentives, and, at the same time, get speed in production in the supplying of new things that the Defense Department needed.

I am afraid I did not ask questions, Mr. Chairman, but this reference to renegotiation naturally intrigued me, and I wanted to venture these observations.

CONGRATULATIONS TO WITNESS

Senator STENNIS. Thank you, Senator Case.

Mr. Secretary, Secretary McElroy, let me commend you for the very fine grasp that it seems to me you have rapidly gained in the second biggest job in our Nation, perhaps, in the world, in a way.

I want to commend counsel, too, for his fine grasp of this subject matter. His examination and your frank responses are among the very best I have heard since I have been in the Senate.

I would like to add, too, I was very much impressed with the way counsel for this subcommittee, and the chairman, and the rest of the staff, have planned and worked out this entire hearing.

Certainly they deserve the thanks of all the committee, and certainly the Nation, for their splendid work and the way they have approached these duties, getting down to the real merits of these vexing problems.

I shall not try in my brief time to go over again the field that has been plowed so well by the attorney for the subcommittee, nor question you with reference to an overall authority.

I remember quite well your responses. Although I am not able to advise you on anything, on this so-called rivalry and so-called redtape in Government, I have been here longer than you have, and have had a better chance and more time to observe it. From what we have heard this week in our open and closed hearings, it seems to me that one of the tragedies of the age would be to be caught up now in the web of the rivalry between the services. We have a crying need for an overall manager for this missile program—though I have great respect for the individual services.

I do not believe, Mr. Secretary, that anything short of that will get the job done. You will be riding for a disappointment if you do not inaugurate, or at least advise the President strongly to inaugurate, an all-out program under the direction of an individual with Presidential authority.

It is with great modesty that I say this, and only after hearing the proof, in open and closed hearings, and realizing so much more vividly just what we are up against.

As I say, I am afraid, without this overall manager with the authority to act, the program will be a shocking disappointment, not only to you, but to the Nation. The decision on this point could well make the difference in our being able to get ahead and get out of the hole that it seems clear we all agree we are in.

And with great deference, I believe that authority must be at the Presidential level; authority above the Department of Defense, if necessary, and over and above the Budget Bureau, if necessary.

I am convinced it must be at that level; it must be the direct authority of the President that this person exercises.

This opinion has been strongly expressed by those that have testified here, and I hope you will hold an open mind on it as you feel your way further in this maze of the Department of Defense.

Secretary McELROY. I read your views in the press, Senator Stennis, and I do respect your service here and your right to a considered judgment, and I certainly would keep an open mind on it, even though my conclusion up to this point has been a little different from yours.

Senator STENNIS. Yes. I fully understand that.

But as a man who is making tremendous headway in grasping the tremendous responsibilities of your new position, I certainly believe that you can hold this question open until later, and I am glad to hear you say that you will.

Thank you very much.

The next gentleman on the list here for calling on is Senator Bush. Senator Bush?

Senator BUSH. Mr. Chairman, I am not going to ask any questions. A great many that I had in mind have been answered but I do want to join with you and others who have complimented the Secretary upon his very fine testimony here today. It is very reassuring in the light of all we know about the dangers that we face to feel that we have a man of your quality, Mr. Secretary, in this very important post, and I feel personally very grateful that that is the case.

So, Mr. Chairman, I am glad to yield at this point.

Senator STENNIS. Thank you, Senator Bush.

Senator SYMINGTON?

Senator SYMINGTON. Mr. Secretary, I would like to join the multitude in congratulating you on your testimony.

I have some questions here based on a memorandum shortly after the firing of sputnik. There were a number of manufacturers worried about some new rules put out with respect to their being forced to do what might be termed self-financing. At that time some of them called me and said that one of the justifications given was the necessity to stay within the debt ceiling.

At that time, therefore, inasmuch as to some extent this was coincidental with sputnik, I took the liberty of writing the President a letter, in which I suggested that if he felt there was anything Congress had done, or was doing, which held up any of our defense effort he call the Congress into special session.

I wrote him on the 8th of October, and received a reply on the 28th of October, most of which consisted of a memorandum from you. If convenient, I would like to discuss some of that memorandum.

Secretary McELROY. It certainly is convenient. I don't have the memorandum before me or the reply.

Senator SYMINGTON. I think I have the original.

Has anybody on your staff a copy?

This memorandum brings points out we have been talking about.

Secretary McELROY. I don't have it, but would you be willing, Mr. Symington, on the questions that you wanted to ask me, to read the pertinent parts?

Senator SYMINGTON. I believe I have a copy here you could take.

In your memorandum you stated, and I quote:

There is no problem confronting us at this time which would require the reconvening of the Congress in a special session.

From that it is clear, is it not, that you believe our national defense problems are not in any way being hampered by insufficient appropriations or authorizations, or too low a debt ceiling, or inadequate legislation; is that a fair statement?

I put it that way because, under the impetus of the now-known Russian developments, presumably if you did feel the Congress was in any way impairing your efforts to make us strong, you would feel we should get together and not wait some 3 months. Is that correct?

Secretary McELROY. At the time this was written you are quite right.

We were not considering that it was our responsibility to advise you with respect to the debt ceiling. I think that would not have been covered in this but certainly the other parts of your question could be answered affirmatively, that we had nothing that we could see in our picture that was an obstruction to our doing our job of supplying what we thought was adequate defense.

Senator SYMINGTON. Did you make any exception to that?

Secretary McELROY. I beg your pardon?

Senator SYMINGTON. Did you make any exception to that?

Secretary McELROY. No; I think there is no problem confronting us at this time which would require the convening of Congress in a special session insofar as the Department, as far as this Department, is concerned.

WE ARE AHEAD ON OVERALL BASIS

Senator SYMINGTON. Thank you, Mr. Secretary.

Then your memorandum reaffirmed that in your opinion Soviet Russia was not ahead of the United States either quantitatively or qualitatively in atomic war weapons, scientific devices or on an overall basis.

Your memorandum also asserted that Soviet Russia is not ahead either in nonmilitary applications of science and technology.

Do you still feel that way about it?

Secretary McELROY. When you take the statement on an overall basis, yes; we do feel that way about it.

Senator SYMINGTON. Thank you, Mr. Secretary.

Then you asserted that the United States is "still distinctly ahead of the U. S. S. R. although the U. S. S. R. may be ahead in certain specific areas."

Do you still feel that way?

Secretary McELROY. That is our belief.

Senator SYMINGTON. You make that statement, Mr. Secretary, despite the now known greater Soviet accomplishments in the ICBM, the IRBM, the testimony of Dr. Teller, General Doolittle, their accomplishments, in thrust and propulsion as evidenced by the satellite, their production of jet aircraft, and their launching of the earth circling satellites, is that correct?

Secretary McELROY. I would say the condition as given—yes; I would say so.

Senator SYMINGTON. I am sorry the hour is so late to put these questions. It is the latest I have interrogated a witness. I trust you will bear with me.

Secretary McELROY. I think so too. I would say we continue to believe that statement; yes.

Senator SYMINGTON. You also made a statement that, we are still distinctly ahead, despite the fact the Russians have around 10 times more divisions than we have, and many times more submarines; but the statement stands; right?

SUPERIORITY A QUESTION OF JUDGMENT

Secretary McELROY. That is right. It is a toting up, they have certain strengths in excess of ours and we have certain strengths in excess of theirs.

It is a matter of judgment, I am sure.

Senator SYMINGTON. Right.

Then the statements of the United States superiority in your memorandum were followed by the warning that—

placing a satellite in orbit should not be taken as the sole index of their overall scientific and technological capability.

Is there not ample evidence in other things of the Soviet scientific and technological accomplishments?

Secretary McELROY. Yes; I think we should have great respect for what they have achieved, and we do.

Senator SYMINGTON. You would not want to minimize the significance of their launching, would you?

Secretary McELROY. No; I should not.

Senator SYMINGTON. Do you agree with me that the American people have had just about enough of running down Soviet technological capacity?

Secretary McELROY. I certainly do.

Senator SYMINGTON. Thank you, Mr. Secretary.

Now, I mentioned that the Soviets have more than 10 times as many Army divisions as we have, approximately 5 times as many submarines in operation, and they have thousands more military jet aircraft units in operation. The testimony we have had from other witnesses is pretty conclusive about their advanced state of development in long- and intermediate-range ballistic missiles. I ask you frankly to detail your assertion that this country is "distinctly ahead of the U. S. S. R. in total military strength."

Secretary McELROY. I think it would be very difficult for me to give that kind of a detailed reply, but I can give you some suggestions as to areas in which I believe we have superiority which is very important.

Of course one of the major areas is in the long-range bomber areas.

One of the areas is in the area of the Navy surface ships, particularly the carrier. One of the areas is the atomic submarines which we feel are very important to us.

We don't know whether they have an atomic submarine, but we feel they do not have it.

While we feel there are certain areas, and one of them is the numbers that they have in the service, where they have an edge on us, there are certain areas where we have an edge on them, and the judgment in adding up their advantages as against ours is a matter of personal judgment in a good many instances.

TREMENDOUS IMPORTANCE OF SAC

Senator SYMINGTON. Do you believe, as some of the other witnesses have said, that probably the most important thing for us to do, inasmuch as much testimony is they are ahead of us in the ground-to-ground long-range missile field. Let's put it this way. Do you agree that SAC is important?

Secretary McELROY. I think it is tremendously important.

Senator SYMINGTON. Perhaps the most important command?

Secretary McELROY. Let me say that the protection of SAC's ability to retaliate, I think, is of the greatest urgency to us.

Senator SYMINGTON. Then do you think we should restore the production schedules for the new planes for SAC that we have taken away this year?

Secretary McELROY. Well, now, I don't quite know what that means. We are moving——

Senator SYMINGTON. Let me make it clearer.

Secretary McELROY. Yes.

Senator SYMINGTON. In the year 1957 production schedules for the procurement of new airplanes for SAC, and money for the development of new airplanes for SAC, have been reduced. There has been a slowdown and cutback in the production schedule.

Do you think that that should be changed as a result of what we now know about what the Russians have accomplished? Or do you think we should continue the policy of a slowdown and cutback, established this year for fiscal reasons?

Secretary McELROY. I would say that my judgment on SAC, and this is after careful consideration of the matter with the commanders of the Air Force, is that we have a capability to retaliate which is a capability which will meet our needs as we look down the road.

Senator SYMINGTON. Could I ask the reporter to repeat the question? I want to be sure you got it, because I don't think you quite answered it. Will you repeat the question, please?

(The question was read by the reporter.)

Secretary McELROY. I was winding up to answer you.

Senator SYMINGTON. Thank you. I beg your pardon.

Secretary McELROY. I think if you don't want the windup maybe I had better say this——

Senator SYMINGTON. I would appreciate your saying it exactly as you would like. I thought you had finished answering the question.

Secretary McELROY. No, no, I was not through.

Senator SYMINGTON. All right.

Secretary McELROY. I will go back to my original point on the essentiality of the retention of the retaliatory capacity of SAC.

I am not aware that the ability of SAC to retaliate requires a restoration of a schedule that may have been cut during 1957.

I am aware that a good deal of concern must be given to certain other aspects concerned with SAC which involves what I suggested earlier, dispersal of bases, speeding up of alert time, and earlier detection, and some redeployment of tanker facilities. All of these things cost money and quite a lot of it. I believe that it is considered by the Strategic Air Command itself that the things that we have named here take the high priority in providing SAC with its retaliatory capability.

So that I think my answer to your question would have to be within the light of the various needs in areas such as missiles. And in the light of the current capacity of SAC to provide this retaliatory capability that the current rate of production of planes for SAC looks to me as if the program is adequate.

Senator SYMINGTON. Are you through, sir?

Secretary McELROY. I am sorry.

Senator SYMINGTON. Are you saying because of priority of missiles, and so forth, and the problems of the economy that you feel we should not replace these reduced production schedules?

Secretary McELROY. I think I am saying that balancing the various and multiple needs in the area of defense.

Senator SYMINGTON. Balancing what?

Secretary McELROY. Well, there are needs for missiles as has been—

Senator SYMINGTON. Pardon me.

THE NEED INCLUDES ATOMIC SUBMARINES

Secretary McELROY. There has been need for missiles as has been made amply clear here in these hearings.

There are needs for a good many things in the various services, there is need for atomic submarines, and so on.

There must be some period at which you say to yourself, "Now to what extent is this needed as against something else." There is some relation to what we can do in this country for defense. It is always a matter of how far you can go. It could be that by spending additional money you could buy some airplanes that could be of a more advanced quality for SAC.

There is no doubt about that. But the airplane that you now have in SAC seems to be adequate to perform their mission of retaliation.

Senator SYMINGTON. Then the reason we are not replacing the production schedules which we reduced, for example, B-52's to take the place of B-36's is because of the priority fiscal requirements of missiles; is that correct?

Secretary McELROY. Well, not with missiles alone.

Senator SYMINGTON. Then priority fiscal requirements in general; is that correct?

Secretary McELROY. In general.

Senator SYMINGTON. Now we have a great many B-36's in the Strategic Air Command. We have scores of them in operation.

Senator STENNIS. Pardon me just a minute. It is the duty of the Chair to advise you, Senator Symington, that under the rules you have run over your time 6 minutes.

Shall we call on Senator Barrett and then I think we will come back to you.

Senator SYMINGTON. I would be glad to handle it that way, Mr. Chairman.

I point out that 1 Senator went 25 minutes but I am glad to yield, just so long as I can get my questions in to Mr. McElroy before the hearing is over.

Senator STENNIS. The Chair feels like he will come back to you.

Senator BARRETT. Mr. Chairman, I would be glad to yield the time here to Senator Symington if he desires to go ahead.

Senator STENNIS. All right.

Under the rules of the committee we will come back to Senator Bush again.

Do you wish to use time, Senator Bush?

Senator BUSH. No, Mr. Chairman. I am very much interested in this questioning and I would be glad to yield if necessary.

Senator STENNIS. Very well.

Senator SYMINGTON. I will be glad to yield to the Chair.

Senator STENNIS. I yield to the Senator.

Senator SYMINGTON. Let's see.

Secretary McELROY. You were saying there were numbers of B-36's.

Senator SYMINGTON. I think I have it.

Secretary McELROY. I am sorry.

RELIANCE ON OBSOLETE AIRCRAFT

Senator SYMINGTON. Now we still have scores of B-36's in the Strategic Air Command, in operational units.

That is a plane which to the best of my knowledge, is older than any combat airplane in either our Air Force or the Air Force of Russia.

It was designed originally before the United States entered World War II. It was classified flatly yesterday by General Doolittle, who probably knows as much about this as anybody, as an obsolete airplane.

We know that Russian defenses—we have been briefed on that this morning—are much improved. We have known for years they (the Soviets) have been working very hard to improve their defenses, in order to prevent our bombers getting into Russia.

Therefore, it is mathematically certain we will lose more crews, and place less bombs on target, if we have obsolete airplanes than if we have relatively modern airplanes.

For those reasons, it is hard for me to see how fiscal considerations should result in our sending crews out in obsolete airplanes. Not only, however, have we not accelerated our B-52 schedule as a result of the technological Pearl Harbor—as I believe Dr. Teller called sputnik—we have not replaced the reduced schedules in the 7 or 8 weeks since sputnik, October 4.

Do you think that is sound policy?

Secretary McELROY. I am not familiar with any cutbacks since sputnik.

Senator SYMINGTON. I did not say sputnik.

I said since sputnik we have not replaced the slowdowns and cutbacks in the production of the——

Secretary McELROY. Not replaced them.

Senator SYMINGTON. Of the B-52's.

Secretary McELROY. Well, I don't think anyone can be in favor of sending crews in planes which are likely to be shot down; if they are American boys certainly I am not in favor of any such policy.

I am also familiar with the fact that there has been a moderate, and I think quite a creditable incorporation of the B-52's into the force.

Also the B-47's, as you well know probably a good deal better than I do, are the backbone of the Force. I think it would be a fine thing if we could replace all the B-47's tomorrow with the B-58's.

It takes some time to do the thing that you would like to do, and I think that is the problem we have here. You can't do all of the things you would like to do in the period of time that you have and within the resources that you have.

Senator SYMINGTON. Of course, one gets stimulated in missiles. We chase the Russians in the missile field. Nevertheless, if we were attacked, we would have to defend ourselves with existing bomber and other forces; would we not?

Secretary McELROY. I think that that needs to be said over and over.

Senator SYMINGTON. But nevertheless, since sputnik there has been no acceleration in the procurement of modern aircraft for the Strategic Air Command; is that correct?

Secretary McELROY. There has been no acceleration in the modern aircraft for the Strategic Air Command. There has been interest, there has been accelerated interest; but I don't know whether I can say that there has been accelerated spending on the B-58.

I think it is about on the testing schedule which is now going through.

OVERTIME RESTRICTIONS

Senator SYMINGTON. There has been no accelerated interest, in the way of orders, for increasing development of the B-58, which you just mentioned; is that correct?

Secretary McELROY. I don't believe there has been any reduction that I am acquainted with in the testing program of the B-58.

If there is I will have to inform you about it.

Senator SYMINGTON. In 1957 since—

Secretary McELROY. I am not familiar with such a thing.

Senator SYMINGTON. Has there been any lifting of the overtime restrictions on the production of planes for SAC, and also for the fighter commands?

I think the directive is 4105.8, a directive issued, I believe, a day after or the day before sputnik, on overtime restrictions.

Has there been any lifting of the overtime restrictions, the 5-day week tempo on producing equipment except some lifting incident to missiles?

Secretary McELROY. There has been no relief of the overtime restrictions on aircraft production, Senator Symington, and we have had no request for relief on overtime from the Air Force.

Senator SYMINGTON. How about the maintenance and operation funds? General Doolittle pointed out yesterday that when he was flying actively, he wanted 20 hours. He said many of our pilots were limited to 5 hours.

I thought it was 4—that some pilots were limited to 4 hours. I do know that when abroad last year, some of the boys actually on the front lines were being limited in their flying time to the point where they did not believe they were being allowed enough flying time to keep properly trained.

We cut back heavily on maintenance and operation funds, and at that time I am certain the Air Force bitterly protested, because I can remember, as an ad hoc member of the Senate Subcommittee on Appropriations for military matters, we had a special hearing at the request of the Secretary of the Air Force. The purpose of this hearing was replacement of maintenance and operation funds. These funds had been reduced in the year 1957.

Do you know if they have been replaced?

Senator McELROY. In that case, too, since I have been here, there has been no request for any relief in that respect. But that does not mean that there has not been some discomfort in the maintenance and operations area. I suspect there has been.

Senator SYMINGTON. Well, regardless of whether you have been requested or whether Secretary Wilson was requested, do you happen

to know whether you have replaced the cuts that were made in maintenance and operation funds in the present calendar year?

Secretary McELROY. I would think that we had not.

Senator SYMINGTON. Thank you, Mr. Secretary.

Secretary McELROY. If there is any error in that, I will report to you. I do not think there has been any replacement.

Senator SYMINGTON. May I say that I think you are correct.

Now, in your memorandum, you brought up the fact that the Soviets were producing less vehicles—the memorandum attached to the President's letter—less steel and less vehicles than produced in the United States; and also that they have less railroad and paved road mileage.

But that is a bit of digression, is it not, from the basic issue of relative military strength?

Secretary McELROY. I think it is some digression. But I think it is not impertinent.

Senator SYMINGTON. I beg your pardon, sir?

Secretary McELROY. I say it is a bit of digression, but it is not impertinent.

RUSSIAN'S HEAVY CONCENTRATION ON STEEL FOR WAR

Senator SYMINGTON. When I was with the National Security Resources Board, the production of steel in this country was 90 some million tons. We were trying to get it to 120.

One of the reasons it was opposed by some people was that at that time the Russians were producing only 18 million tons of steel.

Then we found they were putting 50 percent of that production, or 9 million tons, into military uses. This is back at the start of the Korean war. At that time we were putting about 3 percent, or 2,700 tons of steel into war production.

In other words, with 18 million tons, we having 90 million, they were putting about 3 times more of their steel into military use.

In any case our capacity now is 120 million tons and theirs around 50 million—theirs is 56 million, my staff tells me.

So, if these ratios were going on the same, we would be putting in, say, 3 percent of 120, or 4 million; and they would be putting in 50 percent of 56, which would be 28 million.

That would be possible. would it not?

Secretary McELROY. It would be possible; yes, sir.

Senator SYMINGTON. Now, Mr. Secretary, your memorandum, in talking about the satellite, said that—

It was deliberately disassociated from our military efforts—

and that—

it was undertaken as a sincere and honest effort to contribute to man's knowledge.

I am sure it is sincere and honest.

Would you not also agree, as it now sits, that our satellite effort was a relatively small effort, relatively unsuccessful, and certainly late?

Secretary McELROY. It has been a relatively small effort, which, however, as this letter has pointed out, has been under the guidance of the scientific committee. The military has been the agent of the scientific committee, and while, now that we know the Russians have made a substantial impact on world opinion by their prior placing

of their satellite in the air, I think most all of us would have done things differently, nevertheless I think it should be understood that this was not under the determination by the Defense Department, but by the scientific world.

THE SECRETARY WAS SURPRISED

Senator SYMINGTON. I know that you came into the Department just about this time. May I say with great sincerity that I am very glad as a citizen, you did.

Were you surprised when they launched the sputnik?

Secretary McELROY. I was very much surprised. In fact, I was down at Huntsville, Ala., having just spent the day examining Jupiters, and I am unlikely to forget the time that I heard about the first sputnik. It certainly launched me into a job here on certain wings. So that would be clear to me as long as I live, certainly.

Senator SYMINGTON. Do you remember that some people did not seem to be particularly surprised?

Secretary McELROY. I do, and I suppose if I had been privy to the intelligence knowledge that had been around in the community, I would not have been so surprised, either. But I was very much surprised.

Senator SYMINGTON. Well, I was surprised some people were not surprised; because when defense authorities came before our Subcommittee on Appropriations last August, and asked for money, they said—I want to be sure I state it correctly—that this money was asked for so we would “launch the first artificial satellite.”

Now, the third part of your reply, in the memorandum attached to the President's letter, dealt with the tempo of our ballistic-missile program. You said, in that part of your memorandum:

The ballistic-missile program has had the highest national priority for several years.

That is a quote from your memorandum, and also that—

it had been carried forward with a real sense of urgency and determination, and that progress to date has been splendid.

Would you want to define “splendid”?

Secretary McELROY. I think “splendid” is what you have today; two intermediate range ballistic missiles that they believe can be made operational within a year.

Senator SYMINGTON. You would not call the ICBM setup splendid yet, would you?

QUESTION OF HOW MANY PROJECTS HAVE TOP PRIORITY

Secretary McELROY. No; I think, however, it is well advanced. I think the time has been pretty well compacted, Senator Symington, considering the relatively short period of time we have given this project this degree of priority.

Senator SYMINGTON. On this highest national priority, do you happen to know how many programs are on the highest national priority?

Secretary McELROY. I do not know. There are three, Senator Symington, all in the ballistic-missile field.

Senator SYMINGTON. There are three?

Secretary McELROY. Three.

Senator SYMINGTON. Would that figure be closer to 52 than to 3? If so, would you change it for the record?

Secretary McELROY. Yes; if I am wrong the difference between 3 and 52, I would certainly want to change it for the record.

Senator SYMINGTON. Thank you, Mr. Secretary.

Your letter of October 28 said that you were working on this IRBM, and that soon you were going to have one—and would make a decision to produce 1 of the 2.

That is now changed, and you are going to go ahead with two; is that right?

Secretary McELROY. That is correct.

Senator SYMINGTON. Does not the term "highest priority" become relatively meaningless when projects with such ratings are subjected to overtime restrictions, and control by money ceilings?

Secretary McELROY. Well, I think that is true, if the control of money ceilings means that you do not have the money to proceed.

Now, I think it was expected and intended that these highest priority projects could be maintained without overtime except the overtime which the contractors insisted was essential, and that the cost of doing this would be reduced because of the contractor operating without overtime. I do not think there is anything wrong with that as an objective.

What seems to have happened—and I do not think this was anything major in the whole thing, because it did not last very long—but what seems to have happened was that the comeback to the Defense Department for relief from overtime, where it seemed to be interfering with the high-priority progress, did not come back quite as fast as I think it was intended it should in order to provide the relief.

Senator SYMINGTON. Mr. Secretary, I do not want to quibble. I want you to know that not less than 10 defense manufacturers have protested to me that they are being held back by restrictions with respect to the 5-day week tempo and the overtime limitations. In the memorandums here which I would be glad to show you, they go into considerable detail on the nature of the overtime restrictions.

I believe the latest directive, which has not been changed, sir, had to do with the stopping of decisions at the local level with respect to overtime. So I am not trying to quibble about it, and am wondering what your thinking is. Are you going to speed this up? And, if so, what are you going to do about it?

Secretary McELROY. Are you talking missiles, Senator?

Senator SYMINGTON. Well, missiles first, then existing forces.

Secretary McELROY. You are now talking of 10 manufacturers of missiles?

Senator SYMINGTON. Missile parts and missiles, right.

Secretary McELROY. Well, of course—

Senator SYMINGTON. Has there been a complete release now on missile parts and missiles?

Secretary McELROY. There has been a release, as far as the ballistic missiles are concerned. I am talking about the IRBM, the high-priority missiles systems, and I do not think there is any problem on the others.

Senator SYMINGTON. Here is a statement as of November 1, from a company which says:

On October 1, 1957, a Department of Defense Directive 4105.8 was issued to supersede instruction 4105.48, dated June 19, 1957.

Under the new directive, overtime to make up for delays beyond the control of the contractor may no longer be approved locally. The overtime base may be defined in terms of total labor hours or labor dollars under a contract. Formerly, the overtime base was defined as the total anticipated labor hours under a contract. Overtime may now be applied on a plantwide basis if the contract-by-contract basis formerly required is impractical. Overtime may now be approved retroactively—it formerly had to be approved prior to performance.

Separate instructions to implement this new directive 4105.8 have not been received from any of the military services to date.

We repeat—there has been no evidence of liberalization of overtime rules since the Russian satellite was launched.

Now, that is a company which manufactures——

Secretary McELROY. What is the date of that?

Senator SYMINGTON. November 1.

Secretary McELROY. November?

Senator SYMINGTON. November 1; yes, sir.

Secretary McELROY. I am reminded that particular directive from which you read was one that the missiles were exempted——

Senator SYMINGTON. I beg your pardon?

Secretary McELROY. I am reminded by my associates that the particular directive that you read was one from which the ballistic missiles were exempted.

Senator SYMINGTON. Well, the contractor says they have not had anything to implement it, but perhaps they have had since November 1, or perhaps they did not get the exemption.

However, on existing forces what we must fight with now if attacked, how about the overtime? Has there been any lifting of the overtime restrictions, based on directives, on fighter planes or bombers?

One of the most important things held up, I understand, is base equipment. Are these procurement programs still on the 5-day-week tempo, with overtime restrictions?

Secretary McELROY. They are subject to the directive which you have read, still.

Senator SYMINGTON. Thank you, Mr. Secretary.

Secretary McELROY. The exemptions are limited to the ballistic missiles.

Senator SYMINGTON. Your memorandum goes on to state that certain nonballistic-missile systems have been discontinued, and others are being adjusted to provide this country with a maximum defense capability. Does that refer to the Navaho, for example?

SNARK TOOK PREFERENCE OVER NAVAHO

Secretary McELROY. Navaho would be an example.

Senator SYMINGTON. In the speech the President made, he emphasized the recent performance of the Snark, which, as we all know, is a subsonic, long-range missile. The Navaho is a supersonic, long-range missile, a logical development of air breathers of the type represented by the Snark.

If the Snark is so important—it could be easily knocked down by most of our modern fighters—why is not the Navaho logical, unless we are committing ourselves irrevocably to all-out war, in case of any trouble?

Secretary McELROY. We have the Snark. The Navaho is under development. It looked as if the successors to the Navaho would be coming along in such a way that they could be used, and that the Navaho need not be pursued. Now, you are quite right that the Snark will be superseded by a supersonic missile, when the supersonic missile is available, but the Snark, I think, should not be regarded as no weapon simply because it is an air breather.

Senator SYMINGTON. In other words, you think the Snark will be replaced by a rocket; is that correct?

Secretary McELROY. I would think so.

Senator SYMINGTON. Now, in the next section of your reply about the lagging of the anti-ICBM development, you did not say that the program was lagging due to fiscal restrictions, but you did say it was a complex and expensive program. I am just wondering if the fiscal restrictions on the antiballistic-missile missile have now been lifted.

Secretary McELROY. The problem on the antimissile missile, in our judgment, is not a fiscal problem, but is a technical problem.

Senator JOHNSON. Senator Symington, would you yield?

Secretary McELROY. I am not familiar with any restriction on financing which is restraining the effort which is technically possible in the antimissile-missile field.

Senator SYMINGTON. Mr. Chairman, may I make a comment to that, and then yield to the Chair?

If you find that there was, at least as of the time of my letter, a fiscal limitation on the antiballistic-missile missile, will you correct the record accordingly?

Secretary McELROY. I am not saying that there was not a fiscal limitation, but what I am saying is that the fiscal limitation was not the limiting factor in the progress of the antimissile-missile program.

Senator SYMINGTON. Thank you, Mr. Secretary.

Mr. Chairman.

Senator JOHNSON. What is the pleasure of the committee about recessing for dinner? We previously announced that we were going to have an evening session. We hoped that we could complete the testimony of Secretary Quarles and Mr. Holaday. It now appears to be impracticable or impossible. We would like to go on, after we conclude with the Secretary, with Secretary Quarles.

Senator Stennis needs to leave, and I am sure there are other Senators who would like to know what time we will convene this evening.

If it is agreeable, I would like to make a suggestion that we go on with the Secretary for another 10 minutes, in case we can complete the questioning in that time, and that we reassemble at 7:45 to hear Secretary Quarles.

If we have not completed with the Secretary, we will continue with him, and put Secretary Quarles on at the conclusion of the Secretary's testimony, provided it is not too late this evening.

What do the members of the committee feel about that? Senator Symington, do you have any preferences in the matter? Would you prefer—

Senator SYMINGTON. All I would like to do is get a chance to ask my questions. The President sent me this long memorandum from Secretary McElroy; and I have been working on my analysis of it for some days now, and have covered 1, 2, 3, 4, 5 pages of the analysis, and still have 6. I believe this analysis is important to national security.

Also, I have some questions I would like to ask the Secretary, based on some of the statements he made about the organization of the missile picture, which to me, as one ex-businessman to him another ex-businessman, I do not understand.

But I would be glad to adjust my time any way the chairman would like.

Senator JOHNSON. Well, as you know, each Senator—it was generally agreed that each of us would question the witness 10 minutes, and then rotate an additional 10 minutes, and certainly there is no disposition for anyone to interfere with your questioning or keep you from having a reasonable length of time.

We do have plans to conclude the hearings, and we want to be fair to all Senators, and certainly lean over backward to be sure that you are accorded equal opportunity to question these witnesses.

I had understood that the Secretary had made arrangements, dinner arrangements, in anticipation that he could be through before 7 o'clock.

Secretary McELROY. I have such an engagement, Mr. Chairman. I am available to this committee first, and if that is the desire, I can change that. It involves an international kind of commitment, but I think that probably can be changed.

Senator JOHNSON. Do the minority members have any discussion they care to offer?

Senator BUSH. Would you repeat your suggestion?

Senator JOHNSON. I suggested we continue with the Secretary until 6:15, and then we take a recess until 7:45.

Senator BUSH. I move that.

Senator CASE. Mr. Chairman, I was just going to suggest in view that this involves some international angle, to the thing that possibly we could proceed until about 6:30, and let those Senators who have not a question at all, I think two of them, complete by 6:30 and then let Senator Symington have all the time he wants on the second go-around.

But perhaps——

Senator BARRETT. We waive it.

Senator JOHNSON. As I understand all of the Senators waived their time and this is the second call. Then without objection, the committee will continue until 6:30 at which time we will take a recess until 8 o'clock.

At which time we will resume with whatever witness it is necessary to resume with.

Senator Symington?

Senator SYMINGTON. Mr. Chairman, I would like to follow what Senator Case said; I yield to him now.

Senator CASE. I have already had my go.

Senator JOHNSON. He has already asked his questions.

Senator SYMINGTON. I thank the Chair.

Now, the part of your memorandum, Mr. Secretary, dealt with, and I quote—

recent fiscal measures taken by the Department of Defense justifying the cutbacks and stretchouts and fluctuations of the Department of Defense program.

You referred to and I quote—

the \$38 billion expenditure estimate contained in the fiscal year 1958 budget submitted to and accepted by the Congress.

In fact you refer twice to the expenditure level for fiscal year 1958 as "accepted by the Congress."

You are not attempting to leave the impression, are you that the President's expenditure estimate as contained in the budget document is passed upon by the Congress?

Secretary McELROY. I would not say it is passed on.

The thing that is authorized of course are the appropriations. I assume the figures that are included therein the expenditure estimates are concurred in, I don't know what action is taken, I don't believe any action is taken.

Senator SYMINGTON. There is no relationship between authorization and appropriation by the Congress.

Secretary McELROY. That is right, not necessarily.

Senator SYMINGTON. And whatever money that the President and yourself decided to spend is there. You have an overall figure, a total of the money actually appropriated by the Congress.

Secretary McELROY. That is right.

Senator SYMINGTON. As a matter of fact, when you applied the \$38 billion rigid ceiling—rigid was the word used by Assistant Secretary McNeil before the Appropriations Committee—you had \$70.8 billion available, did you not?

Senator STENNIS. Let's have quiet, please.

Secretary McELROY. There was more authority than the \$38 billion, of course, and there has to be in order to fund the part of the programs that have to be funded years ahead.

Whether the figure was 70, I don't know.

Senator SYMINGTON. I think it was 70.8.

Secretary McELROY. Yes.

Senator SYMINGTON. And I think even leaving aside funds for military assistance, \$10 billion of that total was unobligated, is that correct?

Secretary McELROY. I don't know that it is.

Senator SYMINGTON. The President's fiscal year 1957 budget document contained a defense expenditure estimate for that fiscal year of \$36 billion. But the actual expenditures were 38.4 billion.

So I present that there is no relationship between the budget document and actual expenditures, so far as the Congress is concerned, if the money has been both authorized and appropriated.

I believe it is correct that the expenditure item in the budget document is an estimate; and is treated as such.

It is neither approved or disapproved by the Congress. That is correct, is it not?

Secretary McELROY. Yes, I would say that is my impression. I believe that is true.

Senator SYMINGTON. Thank you, Mr. Secretary.

Now you refer to, and I quote:

Reductions made by the Congress in the Defense Department fiscal year 1956 budget request.

I think the record will show, however, that most of the differences between the President's initial 1958 budget request of 38½ billion, and the amount finally appropriated, was the result of reductions made by the administration's failure to request restoration of House cuts, including messages sent to the Congress saying certain of these reduced funds were not needed.

That is correct, is it not?

Secretary McELROY. Well, that is not my understanding, Senator Symington.

Senator SYMINGTON. Well, now, let's review it.

The original budget request was for \$38½ billion. The President himself first cut that \$500 million. Then the House took 2,600 million more from that 38 billion. The President went before the people on television and said he would accept 1,400 million of that cut.

But he added that he had to have the billion, two hundred million remaining out of the two billion six, else the country would be in very heavy trouble from the standpoint of security. The Senate voted to give him back 971 million of that billion two. Then the Senate went to conference with the House. While at conference, messages came from the Department of Defense and the Bureau of the Budget that the billion two was not needed after all. Is that correct?

Secretary McELROY. I don't know that.

Senator SYMINGTON. I think you will find that that is the record.

Secretary McELROY. I am not—you are talking—

Senator SYMINGTON. Secretary Quarles is shaking his head. We will have an opportunity to discuss it with him. We, in the Senate, know what happened. As a result of the messages from the Bureau of the Budget and the Department of Defense the net restoration of the billion two, was 200 million or thereabouts; 197 million to be exact.

Now, your memorandum justifies the fiscal actions taken by the Department of Defense by referring to the necessity for "keeping within the statutory debt limit imposed by the Congress."

But the record will show that in the 3 preceding fiscal years the President requested increases in the debt limitation, and even though they were temporary, each time they were granted by the Congress. Inasmuch as the story I was getting all over the trade was that the reason being given by Department of Defense officials for forcing companies to finance themselves was the necessity to stay within the debt limit. I thought it would be a good idea to get the matter cleared up by submitting it in special session to the Congress. Your memorandum confirms that thinking by stating—

Referring to the necessity for keeping within the statutory debt limit imposed by the Congress.

If this was in any way preventing you from having an adequate defense structure, why didn't you request a temporary increase in the debt ceiling this year as you have for the past 3 years, especially as each time you got it?

Secretary McELROY. I don't have the answer to that one either, Senator Symington, I don't know.

Senator SYMINGTON. I am only quoting your own memorandum on that, sir.

Secretary McELROY. Yes, I understand.

Senator SYMINGTON. I don't mean in any way to be "pushy." I just want to understand. Would you be good enough to furnish an answer for the record at this point?

Secretary McELROY. Yes, we will; if the reporter will give me a copy of that question I will be glad to give you an answer.

Senator SYMINGTON. I think you will get the question tomorrow, the whole record.

Secretary McELROY. All right.
(The Department of Defense's memorandum on request for increase in the debt ceiling is as follows:)

REQUEST FOR INCREASE IN THE DEBT CEILING

It is not within the purview of the Secretary of Defense to deal specifically with the question of the debt limit. However, it is undoubtedly accurate to say that the executive branch would have requested an increase in the debt limit if it had been felt that the existing debt limit would prevent having an adequate defense structure. This was not considered to be the case.

The executive branch position on staying within the debt limit was stated in the following letter from the Secretary of the Treasury to the chairman of the House Committee on Ways and Means and to the chairman of the Senate Finance Committee.

THE SECRETARY OF THE TREASURY,
Washington, August 28, 1957.

HON. JERE COOPER,
*Chairman, Committee on Ways and Means,
House of Representatives, Washington, D. C.*

MY DEAR MR. CHAIRMAN: As I assume the responsibilities of the office of Secretary of the Treasury and review the situation which confronts the Treasury for the fiscal year which began July 1, I am concerned with the small margin which present forecasts indicate will exist between our financial requirements and the statutory debt limitation of \$275 billion.

During the past 3 years, the Treasury has been operating under temporary year-to-year increases in this limitation—\$6 billion increases during fiscal years 1955 and 1956 and \$3 billion for the year ended June 30, 1957. Even with this leeway, the effective management of Treasury financing has been difficult and, at times, more costly expedients had to be adopted to operate within the debt limit.

In part, the difficulty is caused by the seasonal peaks in collection of corporate income taxes. While the corporate collection plan has been changed by law and collections are gradually being leveled off, it will take 2 more years before corporate tax collections are on a relatively even quarterly basis. In the meantime, the Treasury must borrow large sums in the first half of the fiscal year (July–December) to meet expenditures and pay off such borrowing in the last half of the fiscal year. This happens even though we operate with a budget surplus, as has been the case during 1956 and 1957 and as estimated for 1958.

The best present estimates for the current fiscal year indicate that, during the period October 1957 until March 1958, we shall be within a few hundred million dollars of the \$275 billion debt limit with, at times, very small cash balances. This not only interferes with orderly debt management but gives little margin to meet unexpected contingencies.

However, realizing the importance of keeping within the lowest practicable debt limit, we are ready to try to operate within the present limit. We can do so safely only if there is full understanding of the problem on the part of both the executive departments and the Congress.

Within the administration, this matter has been discussed fully, and I can assure you that every effort will be made to operate within the President's budget.

It is possible that, despite our best endeavors, situations might develop requiring an increase in the debt limit. However, I hope that, by mutual cooperation, we can avoid that contingency.

I have felt I would be remiss in my duties if I failed to bring a current analysis of this matter to the attention of the Ways and Means Committee of the House. I am sending a similar letter to the Chairman of the Senate Finance Committee.

Sincerely yours,

ROBERT B. ANDERSON,
Secretary of the Treasury.

Senator SYMINGTON. Now, you refer to the \$38 billion expenditure ceiling, in the memorandum that the President sent met, as—

not as an arbitrary limit on defense spending but as a step taken by the administration to keep military spending in appropriate balance with the requirements of the Federal Government as a whole.

Testimony by top civilian officials of the Department of Defense challenge this statement. As I mentioned, the Assistant Secretary (Comptroller) said there had always been some guidelines and restrictions; but now these were rigid ceilings. That was his statement.

What would you comment on that?

Was it an arbitrary limit on defense spending or wasn't it?

Secretary McELROY. Well, there was a limit for a period but, of course, since then, as I think is well known, there has been a change.

There has been relief in the spending for the fiscal year, so while there was an attempt to set a limitation it was found that that was not right in relationship to the needs of defense and that it was relaxed to the extent of several hundred million dollars.

THIRTY-EIGHT BILLION DOLLARS WAS "OBJECTIVE" FIGURE

Senator SYMINGTON. And, inasmuch as the directives were actually issued to implement the \$38 billion ceiling, would not that, in effect, challenge any statement that it was not an arbitrary defense limit?

Secretary McELROY. Well—

Senator SYMINGTON. It would seem so, Mr. Secretary.

Secretary McELROY. I think it would be essential that there be some attempt to arrive at a figure that would be your objective figure in any kind of spending. If you do not have that, the thing can go almost anywhere. I think there is no question that there was an objective figure of \$38 billion.

Senator SYMINGTON. I won't pursue it, Mr. Secretary; only to ask would it not be more in the interests of United States security if we attempted to keep defense spending in "appropriate balance" vis-a-vis known Soviet strengths, rather than in relation to the requirements of other departments of the Federal Government?

Secretary McELROY. Well, if we do not determine our defense spending in relationship to defense, defense against our obvious opponent, then I think we are not proceeding as we should.

That part of it I would check with.

Senator SYMINGTON. Thank you, sir.

Now, there is a part of your memorandum I did not understand. It said that this country will not be able to spend adequately for the development and production of new weapons, or even maintain such development and production unless we are successful in holding down expenditures for operation and maintenance, for personnel, and for facilities.

What does that mean?

Would that imply we have a rigid ceiling still on existing forces after sputnik?

Secretary McELROY. We don't have a rigid ceiling. As I have indicated, we have relieved the pressures on the essential items in the military budget.

Senator SYMINGTON. Let me read your memorandum again.

Your memorandum states this country will not be able to spend adequately for the development and production of new weapons or even maintain such development and production unless we are successful in holding down expenditures for operation and maintenance for personnel and for facilities.

Just what does that mean?

Secretary McELROY. I think maybe I can develop that for you.

All of our equipment today as compared with 4 or 5 years ago, and I am sure I don't need to tell you this, Senator, is considerably more expensive per unit than it was 2, 4, 6 years before.

I recently had some calculations given to me on the relative costs of certain representative items in the defense arsenal.

The increases have gone up a great deal faster than has the increase in our productivity in this country, the base on which we have to obtain our tax collections.

It seems apparent that if we are going to continue to make more and more complex weapons systems with each of them being more and more expensive, that as you move forward you will have to look to the increased effectiveness of those weapons systems as letting you gradually reduce the numbers of people in your Armed Forces.

It looks almost as if that becomes inevitable. That is not necessarily true but it looks to me to be so.

So that I would say that that would be my development of the point that you have raised here, and just to give you an example of what I am saying, because I think it is a matter of very serious matter to the whole country, in World War II a carrier, an attack carrier, aircraft carrier, cost something in the range of \$50 million.

That would have been in 1945. In 1953-54, an attack carrier cost something in the range of \$200 million, and the atomic attack carrier cost about \$300 million.

CUTS IN AIRPLANES NOT REPLACED

Senator SYMINGTON. Well, one reason I ask is that if these hearings had only been on the basis of missiles and satellite, they would not have covered the whole picture.

We cannot fight with what we have not got. We can try to obtain what is necessary as soon as possible.

Today the Russians are putting pressure on Turkey.

Of course that is of interest to you as Secretary of Defense. If we are attacked we have to fight with what we have. Isn't that correct?

Secretary McELROY. That is correct.

Senator SYMINGTON. You cut our airplanes in 1957 over a third as against the original budget you presented at the beginning of 1957. Have you done anything to replace those cuts?

Secretary McELROY. No.

Senator SYMINGTON. You have not?

Secretary McELROY. No.

Senator SYMINGTON. Why not?

Secretary McELROY. Well, the answer has got to be, Senator Symington, that your ability to finance the defense effort has got to be considered in all of its aspects. The judgment of the administrative agency, while it may be wrong, also has to be a judgment that is taken; and the judgment that was taken was that the essential Air Force equipment for the needed retaliatory capability was there. While, of course, we would like to have that better, it was regarded as the kind of equipment which could do the job and that seemed also to be the view of the operating people that had the job to do.

Now, I think every part of the Defense Department program could be criticized on the basis that you are criticizing—

Senator SYMINGTON. I am just asking, I am not criticizing.

When the Chief of Staff of the Air Force came before our committee, he said that the budget he was presenting, with the much higher airplane figure was a marginal budget.

He said he was worried about it. He said he thought it might be too little. He said definitely nothing could be taken out of it without affecting our national security.

Now we have taken over 33 percent out of it; and we have not replaced one plane since sputnik.

Secretary McELROY. Thirty-three percent of the money?

Senator SYMINGTON. Procurement of airplanes, in numbers.

Secretary McELROY. Of the number of airplanes?

Senator SYMINGTON. That is right.

Secretary McELROY. Well, of course you apparently are counting 1 airplane as 1 airplane. There has been—

Senator SYMINGTON. Well, I could give it to you the other way. I did not mean to quibble about it, or to be disingenuous about the figure.

But it is a 33½ percent reduction in the number of planes.

Secretary McELROY. You would not suggest that it is a 33½ percent reduction in the number of dollars?

AMPLE PROVISION FOR SERVICES WOULD MEAN TAX INCREASE

Senator SYMINGTON. I never said that. But in my opinion if I still had sons in the services, I would think the heavy reduction in maintenance and operation funds which could only result in more accidents, is a more serious matter than money. I wonder why none of these planes have been replaced since sputnik.

Secretary McELROY. I don't know except in the general terms that I say the needs of the services are way beyond the capacity of this country simply to provide tax funds unless there is a general willingness to increase taxes.

I have not heard anybody suggesting that that is the thing we should do in any broad way.

I have heard some suggestions that that might be required.

Senator SYMINGTON. Well, of course, there are some of us who think that if we adopt such ideas as the Cordiner report, plus some of the recommendations of the Hoover Commission, and have a real weapons system evaluation program for the first time since World War II, we would not need any more money than we are spending now. I am glad to have you say frankly it is a question of the problem of facing additional taxes, and not a problem of facing possible additional Soviet strength, because that was the point I wanted to bring out.

Senator STENNIS. Excuse me. The hour upon which the committee has agreed for recess has arrived, gentlemen, and the committee will therefore take a recess until 8 o'clock.

Mr. Secretary, will that 8 o'clock take care of you all right?

Secretary McELROY. I have a dinner appointment. It will take care of me as far as my dinner appointment is concerned.

I mean I will have to cancel it if that is what is desired by the committee.

Senator STENNIS. I thought that it was understood, we agreed upon the 8 o'clock reconvening hour, and I thought that took care of your situation.

Secretary McELROY. No, Mr. Chairman.

Senator CASE. Mr. Chairman, I thought it was stated that we start with whatever witness was available so if the Secretary feels that it is necessary for him to make that engagement we could proceed with the Deputy Secretary.

Senator STENNIS. That will be a matter within the discretion of the Secretary as to when he will return.

If it takes beyond 8 o'clock we can proceed with Secretary Quarles.

Senator CASE. And with the understanding that the Secretary will return so that Senator Symington will pursue his questioning.

Senator SYMINGTON. I had nothing to do with the scheduling of the hearing.

I simply told the chairman I was available any time day or night, because I believed the security of the United States was of paramount interest. ■

I would like to have the opportunity to question the witness and I would be entirely willing of course to do whatever the chairman considers proper in order to have that opportunity.

Senator STENNIS. Is there objection now to the committee taking a recess until 8 o'clock with the understanding if the Secretary cannot be here he will return as soon thereafter as he conveniently can but the committee will proceed in the meantime with Secretary Quarles if necessary?

Is there objection?

Secretary McELROY. I have no objection. I would like to ask whether it is permitted for a witness to return in a different kind of garb.

Senator STENNIS. Yes, that will be entirely all right.

We will take a recess until 8 o'clock.

(Whereupon, at 6:30 p. m. a recess was taken until 8 p. m. of the same day.)

EVENING SESSION

Senator JOHNSON. The committee will come to order.

Mr. Quarles, would you please stand and raise your right hand. Do you solemnly swear that you will tell this committee the whole truth and nothing but the truth?

Mr. QUARLES. I do, sir.

TESTIMONY OF HON. DONALD A. QUARLES, DEPUTY SECRETARY OF DEFENSE

Senator JOHNSON. Mr. Quarles, you have probably had longer and more extensive experience in this field than almost any other high official in the Pentagon. The committee is anxiously awaiting your testimony. There are many decisions and many actions upon which I think you are the best-qualified man to shed light.

I understand you have had a long career in both industry and Government. Your experience covers both research and production. In order that the record will be complete, I am asking the reporter to insert at this point your biography which sets forth your experience and your qualifications.

(The biography of Mr. Quarles referred to is as follows:)

DONALD A. QUARLES, DEPUTY SECRETARY OF DEFENSE

Mr. Donald A. Quarles was born in Van Buren, Ark., July 30, 1894. He entered Yale University in 1912 and graduated with a bachelor of arts degree in 1916. He enlisted in the Army in May 1917, served 2 years in France and Germany, and was discharged with the rank of captain in the Field Artillery.

Employed as an engineer by the Western Electric Co. during 1920 and 1921, Mr. Quarles studied theoretical physics as a part-time student at Columbia. Joining the inspection engineering department of Western Electric in 1924 (which became the Bell Telephone Laboratories the following year), 4 years later he was in the outside plant development department, being placed in charge of this department the following year.

From 1940 to 1944, Mr. Quarles was director of the transmission development department which concentrated on military electronic systems, particularly radar, of Bell Telephone Laboratories. He was then appointed director of apparatus development, and in 1946 also became a member of the newly established Committee on Electronics of the Joint Research and Development Board, Department of Defense, and in 1949 he was named Chairman of that Committee.

Meanwhile, in 1948, Mr. Quarles was designated vice president of Bell Telephone Laboratories. He was made vice president of Western Electric and president of Sandia Corp., a Western Electric subsidiary which operates the Sandia Laboratory in Albuquerque, N. Mex., for the Atomic Energy Commission, on March 1, 1952.

On September 1, 1953, he was appointed Assistant Secretary of Defense (Research and Development). Selected jointly by the Secretaries of Defense and Commerce to be the first Chairman of the reorganized Air Navigation Development Board in January 1954, 2 months later the President appointed Mr. Quarles a member of the National Advisory Committee for Aeronautics.

Previous to his present position Mr. Quarles had served as Secretary of the Air Force, having been given an interim appointment by President Eisenhower on August 11, 1955, and sworn into office August 15, 1955. He was confirmed by the Senate February 16, 1956.

Mr. Quarles was nominated to be Deputy Secretary of Defense by the President on March 26, 1957. His nomination was confirmed by the Senate on April 9, 1957, and he was sworn into office on May 1, 1957.

Senator JOHNSON. The committee is pleased to have you here. We apologize for the length of the session today and the necessity of calling you this evening. But the urgency of the problem at hand, with Thanksgiving just upon us, we think that we should attempt to complete the schedule we have outlined. We appreciate your coming here, and if counsel will proceed with the questioning, we will get on.

UNDERESTIMATION OF OUR STRENGTH DANGEROUS

Mr. QUARLES. Mr. Chairman, might I say just a brief word. First I want to thank you for your very kind words and express appreciation that you would be willing to come this evening to extend this hearing, and I am very happy to be here and to do everything I can. I sensed this afternoon as I listened that we were all emphasizing one aspect of the problem that we have, namely, the aspect of recognizing our weak points and finding in every possible way that you and we together could find a correction for them.

It seems to me that perhaps we might be in danger of creating a world impression that our weak points are weaker than they actually are at this time, and I think you will agree, Mr. Chairman and gentlemen, that it is a very important thing for us not to err on that side as well as not to err on the side of either complacency or failure to recognize our weak points, and to make every effort to correct them.

So if I in attempting to answer your questions or to testify here seek to keep this thing on the balance of not either overemphasizing

our weaknesses nor, I trust, giving you any impression whatever of complacency, I think you will understand, Mr. Chairman, why I am doing that.

Senator JOHNSON. I certainly understand, and that is the viewpoint, I hope and I think, of each member of this committee.

Mr. QUARLES. I am sure it is.

Senator JOHNSON. As I stated on yesterday, the times do not call for either hysteria or siesta.

Mr. QUARLES. I have noted your expression, Mr. Chairman, and I thought it was very well expressed.

Senator JOHNSON. Mr. Counsel, will you proceed with the questioning.

Mr. WEISL. Secretary Quarles, would you be good enough to state what positions you have held in the Government?

Mr. QUARLES. I was for some time a member of and then Chairman of the Electronics Committee of the Research and Development Board. That perhaps was not a position in the Government in your sense.

I first became a member of the Government, came into the Government, in 1953 as Assistant Secretary of Defense for Research and Development. In the summer of 1955 I passed from that job to the secretaryship of the Air Force. And last May 1 I became Deputy Secretary of Defense, which I now am.

Mr. WEISL. Mr. Secretary, the document which Senator Symington so ably and so thoroughly questioned Secretary McElroy on was prepared when?

Mr. QUARLES. I cannot answer that with precision, but it was prepared, of course, shortly before it was dispatched, and I think that dispatch, Senator Symington said was October 28. Do I remember correctly?

Senator SYMINGTON. That is right. It was dated October 28.

Mr. WEISL. When did the preparation of this document begin?

Mr. QUARLES. Again we, of course, received a copy of Senator Symington's letter to the President shortly after it was dispatched, I presume around the 10th of October just roughly. And we certainly started considering a response to it around that time.

Mr. WEISL. How long had Secretary—

Mr. SYMINGTON. Will counsel yield there for the record? The date was October 8 that I mailed the letter and I had an acknowledgment from the White House within a week that it would be answered. I thank the counsel.

Mr. QUARLES. Thank you very much.

Mr. WEISL. How long had Secretary McElroy been in office when this document was prepared?

Mr. QUARLES. The record will show that he was sworn in as Secretary of Defense on October the 10th, was it not? I would have to correct that from the record, but it was about that time, Mr. Counsel. (Secretary McElroy was sworn in on October 9, 1957.)

Mr. WEISL. And he had very little background in these matters at that time, is that not correct, Mr. Secretary?

Mr. QUARLES. I should say that relatively speaking he did have, although, of course, he had devoted some considerable amount of time in prior weeks to becoming acquainted with the defense problem.

Mr. WEISL. Who prepared the document?

Mr. QUARLES. It was prepared by a number of people, and I cannot say again just who they were because a number of departments participated in the reply, Mr. Counsel. I participated in it at one stage, but it was largely prepared in the staff sections of the Defense Department.

Mr. WEISL. And who supervised the preparation of it?

Mr. QUARLES. I think it is fair to say that in a final sense Mr. McElroy did, and acting for him and in his behalf, I certainly did to some degree.

SAC TOP PRIORITY DETERRENT TO WAR

Mr. WEISL. Senator Symington very properly pointed out that the greatest defense that we now have against a possible attack by the Soviet Union is SAC and he very properly pointed out that that department should be given every maximum strength. Now, is that the only weapon or the only branch that we have to repel an attack?

Mr. QUARLES. No, it is not, Mr. Counsel. As you are well aware, while SAC constitutes the bulk of our retaliatory striking force, of course, it in a literal sense is not designed to repel attack but to prevent one from being formed against us. However, it is certainly a top priority deterrent to war, and I think perhaps that is the sense with which you ask the question. But it is by no means the only one. In fact, one could name many others.

Mr. WEISL. Our country is in danger of an attack by submarines launching guided missiles against our coastal cities; is that not true?

Mr. QUARLES. I would say that is one of the dangers; yes, sir.

Mr. WEISL. And the United States Navy must be fully equipped to its maximum strength to destroy and kill submarines in such an eventuality.

Mr. QUARLES. I would agree that the United States Navy is an important defense against submarines and submarine-launched missiles; yes, sir.

Mr. WEISL. And the ability of the aircraft carrier to launch jet planes into the heart of the enemy might also be a deterrent, might it not?

Mr. QUARLES. It certainly is one of them; yes, sir.

Mr. WEISL. And the Navy must also be kept in preparedness for limited wars if they may come.

Mr. QUARLES. That is also very true; yes, sir.

Mr. WEISL. And the Army must be kept in readiness and in full strength for limited wars, if they should come.

Mr. QUARLES. When you say "in full strength" that is a word I have not heard defined, but we certainly must consider the strength of the Army in relation to limited wars.

Mr. WEISL. What responsibilities have you had, Mr. Quarles, in the missile program?

Mr. QUARLES. Of course, I go back to my own experience in industry. I am not quite sure how far you wish me to go back in response to that question.

Mr. WEISL. I understand, to make it easy for you, that in 1945, as early as 1945, you worked on missiles for the Western Electric Co.

Mr. QUARLES. And the Bell Telephone Laboratories; that is correct. And I was not quite sure that your question led back that far, but since you have mentioned that, I might say that all through World

War II I was very much interested in and had some part in the development of military electronics, with some missile work during that period, and after World War II, our laboratories and our factories became very much involved in the development and production of guided missiles of various kinds.

Mr. WEISL. In preparing for a defense against a possible enemy attack, I know that the Department has been concerned with the capabilities and the strength of the enemy or the potential enemy.

Mr. QUARLES. Yes, indeed, sir. That is exactly right.

Mr. WEISL. Have you given that very much consideration in your present capacity?

Mr. QUARLES. I have given it very careful consideration throughout the period of my actual holding of office in the Department of Defense.

Mr. WEISL. My associate, Mr. Vance, tells me that I did not give you an opportunity to complete your experience in the missile program. If I did not, please proceed.

Mr. QUARLES. I hope you will pardon me if I do not tell you as much as you wish to know, but just very briefly, after my experience in the Bell Telephone Laboratories and the Western Electric Co., I went to become the president of Sandia Corp., a contractor of the Atomic Energy Commission, responsible for the development of atomic weapons and warheads. And my responsibilities there related to missiles in the sense that it dealt with the warheads for such missiles.

I came from there to the Government, and in my capacity as Assistant Secretary of Defense for Research and Development, I had certainly very considerable contact with the missile program of the services, and dealt with the research and development aspects of those programs.

Of course, as Secretary of the Air Force, again I had responsibility as such for the missile programs of the Air Force, not implying that the Secretary does more than you understand full well the Secretary does, and then in my present capacity I certainly continued to be very much interested in the missile programs of the military departments.

Is that, Mr. Counsel, about the kind of coverage you wish?

QUARLES BELIEVES WE ARE AHEAD ON WHOLE MISSILE PROGRAM

Mr. WEISL. Yes, sir.

How do you estimate what our present position is from your experience and the information that you have gathered concerning the strength of Russia in the field of long-range missiles, intermediate missiles, and other missiles?

Mr. QUARLES. I will have to break that question into parts because, as you realize, it has different answers in different parts.

Taking the missile program as a whole, and comparing their program with our own, I estimate that as of today our program is ahead of theirs.

Taking the long-range ballistic-missile program, apart from the missile program as a whole, I estimate that as of this time our program either is on a par with theirs, or that the differences are such that viewed, by and large and taking everything into account, one would find it very hard to say which program is ahead.

I think it is a neck-and-neck kind of situation, and one would need to define terms very accurately to state that one or the other is ahead.

This includes a lot of different factors, not only their program in the building and testing of rockets, which I may say they have shown great energy and skill in, but includes all of the other factors that go to make up the potency of long-range ballistic missiles in the balance of military power at the present time.

Mr. WEISL. Let us break the missile program up. How do you construe the strength of Russia in the intercontinental ballistic-missile field?

Mr. QUARLES. Mr. Counsel, I would like to say here, and then ask your indulgence to speak beyond that in a closed session—I would merely like to say here that in my estimate, and taking the intercontinental field, the intercontinental ballistic-missile field, and again considering it in its broadest context, after a very careful analysis of all the available information known to us about the programs of both sides, I would say that one could not with assurance state that either side is ahead at this time. Although I would like to add to that, as Secretary McElroy said, I feel that we should base our programs on the assumption that they are ahead, and that therefore we should take very seriously their position in this field.

THE OPINION IS HIS OWN

Mr. WEISL. Do the members of the Air Force, the Navy, and the Army agree with your estimate?

When I say "members," I mean the heads of the branches of the Army, the Air Force, and the Navy.

Mr. QUARLES. That is a very difficult thing to say. I think I was expressing what one might call a professional evaluation of my own, rather than the position of our Department. However, to the best of my knowledge, what I have said would be concurred in by the heads of the three service departments.

Mr. WEISL. What do you base that conclusion on, Mr. Quarles?

Mr. QUARLES. I base it on all available intelligence information and a very considerable amount of information about our own programs.

Mr. WEISL. What is our program in the intercontinental ballistic-missile field?

Mr. QUARLES. Our program is for the development of two intercontinental ballistic missiles of somewhat different configuration, and therefore of somewhat different time schedules.

I think if I might, I would like to reserve the rest of the answer to that question for a better occasion to discuss it fully.

Mr. WEISL. Would you like to also reserve the answer to the question of when these missiles will be ready?

Mr. QUARLES. I think I should, sir.

Mr. WEISL. Very well.

And is the same true with reference to the medium-range missiles? Would you rather discuss that in closed session?

Mr. QUARLES. Except to say, Mr. Counsel, if I might here, that we also have 2 programs of land-based intermediate-range missiles of nominal 1,500-nautical-mile range. Both of these programs have proceeded to an advanced stage of test and to a point where our scientific advisory people who study these programs have expressed the opinion that they are confident that both can be successfully completed. And, as the Secretary announced this afternoon, we have

accordingly determined within the last few days that both should be put into production, and we should proceed with deployment. And we believe we can do this with considerable confidence.

Mr. WEISL. And you would prefer to not state the dates?

Mr. QUARLES. If I may; yes.

Excuse me, I would remind the committee that we have announced this afternoon the plan to accomplish the first deployment of these by the end of the next calendar year. And I think that much of the date is appropriate to repeat here.

Mr. WEISL. Is that the completion of a prototype?

Mr. QUARLES. No, sir; that is the deployment of weapons in the field.

Mr. WEISL. And have we a prototype now ready?

Mr. QUARLES. I would prefer to answer that question in executive session.

Mr. WEISL. Very well.

What do you know about Russia's preparedness in that field?

Mr. QUARLES. I can say, sir, that the committee, I believe, heard Mr. Dulles and his people make a presentation on that subject. I think it is fair to say that I know the material that they presented to the committee. I think it would be better to discuss what that material is at another time.

Mr. WEISL. I take it you concur in their evaluation of that material?

Mr. QUARLES. I would have to be a little careful about that because I am not sure exactly what evaluation they gave you, so I think I would have to examine that a little more in detail, sir.

Mr. WEISL. Very well, sir.

Now, one of the complaints that has been made is the one relating to the complacency of the American people, the fact that they have not been aware of the strength of Russia, both scientifically, militarily, and technologically.

Some of the statements, Mr. Quarles, that you have made, and I am sure made in the best of faith, have contributed, I believe, many people believe, to that complacency. For instance, on November 11, you appeared on television, and in answer to a question, you stated—referring to the fields of military technology—and I quote:

I should say that you have to look hard to find fields in which they were definitely ahead of us, but I do agree that the earth satellite is one particular area.

Do you recall making that statement?

Mr. QUARLES. I do recall making that statement. I think that is a statement you might say out of context. There are a number of other things were said, but nevertheless I did make that statement, Mr. Counsel.

Mr. WEISL. Would we have to look very hard to find any fields in which they are ahead of us?

Mr. QUARLES. I would say that if you enumerated all of the possible fields, that you would have to search among them for the fields in which they are definitely ahead; yes, I would, sir.

THRUST OF RUSSIAN ROCKET ENGINE GREATER

Mr. WEISL. Are they ahead of us in the field of rocket engines with a thrust much stronger and more powerful than ours?

Mr. QUARLES. They have a rocket engine in my opinion that has a thrust, an individual rocket engine that has a thrust greater than the thrust of any of our rocket engines. But this again does not really speak to the problem, because the problem is how many of these rocket engines you associate in a missile and how well they work.

So, I think while the statement is true that they have one that is more powerful as an individual engine than any we have—at least we believe they have one, we credit them with having one—I think that one would be even there cautious about the statement that they were ahead of us in rocket engines.

Mr. WEISL. Would we not be safe in at least assuming that they might be ahead of us in that field?

Mr. QUARLES. We would be safer from the point of view of shaping our programs to make that assumption, I agree.

Mr. WEISL. Have we shaped our program on that assumption?

Mr. QUARLES. I would say we have, yes, Mr. Counsel. I would say that from the time that we undertook these high priority programs in this field, that we have shaped our program on that assumption.

Mr. WEISL. And you are taking into account what Senator Symington brought out in questioning Secretary McElroy with reference to overtime?

Mr. QUARLES. I am taking that into account. I recognize that that is a complicated history and one that it would be necessary to deal with rather carefully. But I am taking that into account in my answer, because the highest priority programs that are a response to the Russian development of very powerful rocket engines have, in my judgment, been rather carefully protected throughout this period. And I believe that is the testimony of the people that are running the programs, with some exceptions, some specific exceptions which we corrected as soon as we found them.

Mr. WEISL. Has research been an important part in the development of that program?

Mr. QUARLES. Research, sir, is a word that we must define. Of course, you might call the whole program research, or perhaps you refer to more basic research that underlies the programs, and I think, though, that I could answer the question; yes, research has been an important thing, however you define it.

Mr. WEISL. Congress, at the request of the Defense Department, appropriated \$1,700 million, I believe, for research, basic and applied, so that you must have considered it very important to get Congress to make that appropriation; is that not correct?

Mr. QUARLES. That is correct, Mr. Counsel; yes.

Mr. WEISL. And even though you say that the safest course to pursue was to assume that the Russians were pretty far along on an intercontinental ballistic missile, \$170 million was cut off the research program.

Mr. QUARLES. Mr. Counsel, I am glad you gave me an opportunity to straighten out that record, because that is not exactly correct.

Mr. WEISL. I want you to have every opportunity to straighten everything out, Mr. Quarles.

Mr. QUARLES. Thank you, very much.

Mr. WEISL. We are looking for the facts and nothing else.

Mr. QUARLES. I realize that, and I certainly appreciate it.

The facts in this case are that the Congress did appropriate something of the order of \$1,600 million, or maybe it was as much as \$1,700 million. I think that figure is a little large, but it is in that order, in the account that we call research and development.

In addition to the appropriations in that account, there are used for research and development funds available from other accounts of procurement, construction, and in minor degree from operation and maintenance accounts. And these additional funds bring the total of \$1.6 billion up to something in excess of \$5 billion.

Now, the only instruction that went out from the Defense Department did not deal with the appropriation for research and development. That was left intact and it was not withheld. Departments were, however, asked to decrease their activities in these other support areas by an amount equal to 10 percent of the, let us call it \$1.7 billion; so that, in effect, there was withdrawn from research and development activities in the development part of the job and not in the ballistic missile part of the job, there was withdrawn a total of something like \$170 million temporarily until the matter was studied and the departments showed cause for replacing it. And that restriction on the departments has now been withdrawn.

Mr. WEISL. Was the 10-percent cut in that field consistent with the feeling of urgency?

Mr. QUARLES. It would certainly not have been, had it not been applied discriminately.

Of course, it was assumed that the departments in withholding \$170 million would withhold it not from high-priority projects of the kind that you are speaking of.

However, when on careful analysis it appeared that it would affect not these ballistic-missile programs, but some others that we considered to be of such importance under present circumstances, as I say, the restrictive order was withdrawn.

Mr. WEISL. What other programs did it affect if it did not affect ballistic-missile programs?

Mr. QUARLES. It affected research and development programs in many other areas, and I cannot detail them because one would probably have to name 50 or 100 programs. I will be glad to supply that for the record, Mr. Counsel. I cannot name them. If you will excuse me, they did not affect our highest priority programs.

Mr. WEISL. Did they affect the satellite program?

Mr. QUARLES. They did not; no, sir.

Mr. WEISL. Did they affect the airplane program, the bomber program?

Mr. QUARLES. I am sure that they did affect some of the airplane programs. I cannot be more explicit than that. They did not affect the bomber programs, the B-52 program and the tanker for the B-52 program, were unaffected by these changes.

Mr. WEISL. What programs were affected?

Mr. QUARLES. I will have to supply that for the record, sir. I cannot answer that offhand.

Mr. WEISL. You heard the thorough examination of Secretary McElroy by Senator Symington in connection with the cutback of the production of B-52's; did you not?

Mr. QUARLES. I did hear the discussion; yes, sir.

Mr. WEISL. Did you consider that cutback consistent with any feeling of urgency and an assumption that Russia had strong capabilities in the ballistic field?

Mr. CHARLES. I would like to straighten out that record, too, Mr. Counsel.

Mr. WEISL. Please do.

(The Department of Defense memorandum on programs affected by the decrease of activities supporting research and development is as follows:)

STATEMENT FOR THE RECORD FOR THE SENATE PREPAREDNESS INVESTIGATING
SUBCOMMITTEE

The impact upon Department of Defense programs caused by implementation of the August 17, 1957, memorandum from the Secretary of Defense can be considered only in the full context of the "research, development, test, and evaluation" program. Within this broader program, the research and development appropriations, as such, represent only one of several major elements. The entire scope of the "research, development, test, and evaluation" program is indicated in the statement which appears on page 1921 of the hearings on the fiscal year 1958 Department of Defense appropriations before the DOD Subcommittee of the Committee on Appropriations, House of Representatives (a copy of which is attached). These data indicate the necessity of adequate and well-balanced support from other appropriations to pursue effectively programs financed under research and development appropriations.

In the early fall of 1957, steps were being taken to effect reasonable control of Defense Department expenditures. Consequently, all programs were carefully reviewed, and procurement and production was one area in which some adjustment seemed feasible. The need for devoting adequate effort toward procurement of modern end items to equip the operating forces required that some effort also be directed toward reducing the amount of funds devoted to the support of research and development provided from procurement and production appropriations. As a part of this overall review effort, it seemed necessary to make sure that a balance would be maintained between the effort to be funded from research and development appropriations and the related funds provided from procurement and production appropriations. In this broad concept, the memorandum of August 17, 1957, was issued, and it provided as follows:

"In connection with various steps now being taken to review programs and to make changes required to meet expenditure objectives, available research and development funds may be fully utilized but at the same time a reduction will be made in the amounts utilized for this purpose from the procurement and production appropriation. The support of development, test, and evaluation provided from procurement and production appropriations must be kept to a minimum so that maximum funds may be utilized for materiel requirements of the operating forces.

"To accomplish this objective and at the same time to continue a balanced research and development program including adequate support of the type previously planned for funding under procurement and production appropriations makes necessary revisions in the programs presently planned for funding under both research and development and procurement and production appropriations. These programs will therefore be adjusted to the extent necessary to reduce support requirements under procurement and production appropriations by a total amount not less than 10 percent of the fiscal year 1958 research and development appropriation for each department, and such requirements will then be funded under research and development appropriations.

"Revised project listing for research and development appropriations will be submitted which will show separately the items transferred."

The implementation of the instructions contained in the August 17, 1957, memorandum was still under review by the military departments, and revised programs had not yet been submitted for review by the Secretary of Defense on October 28, 1957, when the August 17, 1957, memorandum was rescinded. It is therefore not possible to state categorically which programs were actually delayed as a result of the August 17, 1957, memorandum.

It must be recognized that during this period the military departments were required to take steps to stay within established expenditure ceilings and also that the Department of Defense started fiscal year 1958 operations under a

continuing resolution, because of late appropriations and apportionment actions, which required extensive control of the rate of obligations of anticipated fiscal year 1958 funds, as well as unobligated balances of prior year funds. These actions, which affected all programs, as well as the August 17, 1957, memorandum had an influence on research and development and related programs, some of which were curtailed. It is, however, not practicable to distinguish clearly the impact of the August 17, 1957, memorandum as distinct from the impact of the other circumstances noted above, since the 10 percent of research and development funds placed in reserve for each military department as a result of the memorandum did not, in general, involve withholdings on specific projects.

With full recognition of these circumstances, the following information is furnished with respect to the actions taken by the military departments in response to the August 17, 1957, memorandum:

ARMY

The Army conducted a detailed reexamination of its entire research and development program to determine the extent to which compliance with the Secretary's memorandum would necessitate reorientation of the program and concurrently made a strong reclama to the Secretary of Defense. Although the memorandum was rescinded before its terms were implemented, some delay was experienced in the initiation of a number of research and development programs.

NAVY

The Navy decided to continue the research and development programs as originally planned and to apply the reduction to the procurement and production support program. This proposal had been submitted to OSD but not yet approved at the time the August 17, 1957, memorandum was rescinded. Thus, the net effect on the program supported by research and development funds was nil; but there was a slight delay in initiating certain items supported by the procurement and production appropriations.

AIR FORCE

Prior to the August 17 memorandum, the Air Force decided to apply a reduction to obligations planned for its research and development programs to effect a net 5 percent reduction in spending rate as a part of the requirement to control expenditures within the overall expenditure ceiling assigned to the Air Force. The August 17, 1957, memorandum appears to have had no specific effect on Air Force research and development programs beyond that already resulting from the Air Force efforts to control expenditures and the review of obligations made necessary by the continuing resolution.

PROGRAM FOR CUTBACK CAREFULLY EXPLAINED

Mr. QUARLES. The program on B-52 production today is exactly the program that we presented to the Congress last summer. There has been no cutback in it. The program on KC-135 tankers today, which is the main support item for the Strategic Air Force, is the same program that we presented to the Congress in support of the budget last summer.

I think that I am correct in saying that while there was such a change, the change was thoroughly explained at that time, and so far as I know, was disagreed with by no member of the Congress to whom we presented the program. To be more explicit—

Senator SYMINGTON. Will counsel yield to me there for a comment?

Mr. QUARLES. If I might, please, sir, finish my response—the change from 20 per month for the B-52's to 15 a month was not a cutback in production but a change in future plans for production. What we did was to conclude, on careful study of the problem, that it would be wise to hold production at 15 a month, which we reached last June, rather than having it carry on to 20 a month which we would have reached at about the present moment in our schedule.

And the reasons for that change were explained in great detail to both the House and Senate committees interested, and in brief they were that by doing so, we could get a substantially greater proportion of an improved model plane and the final time of equipping our 11 heavy wings was not seriously affected. But what we all, I think, agreed at that time was that this was a wise program, and it is the way the program was left with the Congress at that time.

Mr. WEISL. I will yield to Senator Symington if you do not take too much time, because there are so many questions I would like to ask the Secretary.

Senator SYMINGTON. I thank the counsel and I will take a very short time. I checked very carefully the record, and I was taking about the beginning of the year, not about last summer, and unless the people who are producing the airplane have given me misstatements of fact, the statements that the Deputy Secretary of Defense has made are incorrect, and I would ask the counsel's permission and the committee's to put the facts in as were given to me within the last 7 days, giving the statement that the slowdown, the stretchouts of the B-52 program that originated in 1957 have not been restored, and that the reason given was fiscal—money, budgetary problems.

I thank the counsel.

Senator CASE. Mr. Counsel, reserving the right to object, and I am not going to object—I merely want to ask that Mr. Quarles may have an opportunity to comment upon the statement.

Senator STENNIS. Gentlemen, can we proceed in regular order here.

Senator CASE. Unanimous consent is asked, to suggest, that is, regular order, the suggestion if that is to be inserted, Mr. Quarles have the opportunity to comment upon the insertion.

Senator STENNIS. Without objection, it is so ordered.

Mr. QUARLES. May I do so now, Mr. Chairman?

Senator STENNIS. You do not have it ready now?

Mr. QUARLES. Yes, sir, I do; yes, sir.

Senator STENNIS. Proceed.

Mr. WEISL. Would you like to comment on that statement made by Senator Symington?

Mr. QUARLES. I would like to comment, sir, to say the statements I originally made are, to the best of my knowledge and belief, completely factual statements. I think the Senator himself will remember our discussion of precisely these points and precisely these numbers last summer when the budget was under discussion, and I think the record of the discussion at that time will show that what I have said today is precisely correct.

Mr. WEISL. Mr. Quarles, did you advise the Senate committees of the progress being made by Russia in the ballistic-missile field at that time?

Mr. QUARLES. We did, sir. We had discussions with, I think, all of the committee about the progress of the Russian ballistic-missile program.

Mr. WEISL. I believe Senator Symington in his statement was referring to the beginning of 1957, not the summer.

Mr. QUARLES. Mr. Counsel, I said nothing about Senator Symington's remarks. I answered your question and stated what I had stated to the Congress last summer in support of the program.

Mr. WEISL. Was there any cutback in the number of tanks being produced for the Army?

Mr. QUARLES. I will have to answer that question for the record, Mr. Counsel. I do not know the answer offhand.

Mr. WEISL. Was there any cutback in the number of submarines being produced for the Navy?

Mr. QUARLES. Subject to correction in the record, I would say that I know of none, but I am not sure of the answer to that.

(The Department of Defense memorandum on tank production and submarine construction is as follows:)

MEMORANDUM

TANKS

The programmed annual rate of production for M48A2 tanks remains unchanged at 900 (75 per month). However, there has been a gap in production of 5 months in 1957 after completion in July of the ALCO Products contract. Award of the fiscal year 1957 quantity of 900 tanks to Chrysler Corp. was made on May 31, 1957, and production at Chrysler is to commence in January 1958 and is scheduled for a year at the rate of 75 per month.

SUBMARINES

The award of 2 of the 3 guided missile nuclear submarines in the fiscal year 1958 program has been deferred by the Navy Department until fiscal year 1959. No delay in completion is expected to result from this deferral of award, however. This is so because completion of contract design will occur late in the 1958 fiscal year (May) and working plans for actual construction begin to become available from the lead yard several months later. In the meantime the longer lead time material items are being procured for all 3 submarines. There have been no directed changes in private shipyard construction programs. In Government-owned shipyards, there has been some stretchout in estimated delivery dates.

WE ARE AHEAD IN ELECTRONICS IN GENERAL

Mr. WEISL. Turning again, if I may, Mr. Quarles, to statements that have recently been made by you, not to deny their accuracy but merely to test the basis on which you made them, I call your attention to the following statement which you made over television about 2 weeks ago.

In discussing the capabilities of Russia as compared to ourselves, you stated, and I quote:

I feel we are ahead in electronics. I feel we are ahead in atomic weaponry. I feel we are ahead in many branches of aviation, but I do not include the particular area of earth satellites which isn't, incidentally, a military area.

Is that a correct quotation?

Mr. QUARLES. I think it is substantially so; yes, sir.

Mr. WEISL. In what electronics field relating to ballistic missiles are we ahead of Russia?

Mr. QUARLES. Well, if you pin the electronics area down to ballistic missiles, I would feel I had to discuss that in closed session, Mr. Counsel.

Mr. WEISL. Is that not what was being discussed on that program?

Mr. QUARLES. I think if you take it in context, sir, you will find that it was not being discussed. I was talking about these areas of technology across the board. I was not talking about electronics and ballistic missiles. That would be certainly not a matter to single out for discussion.

Mr. WEISL. The program was started, Mr. Quarles, and I merely am trying to quote it correctly:

Recent successes in rockets and missile development by the Soviet Union have resulted in serious criticism both at home and abroad of our scientific progress in that field.

Would you not say that that was a discussion of ballistic missiles?

Mr. QUARLES. I would certainly say that was; yes, sir.

Mr. WEISL. And it was in that connection that you were questioned about our progress, and you stated—and if I am quoting incorrectly or giving the wrong impression, I would be happy if you would correct me—you said we were ahead in electronics, and I am asking just for the information of the committee where in electronics were we ahead as far as the ballistic-missile program is concerned?

Mr. QUARLES. I have to say that my remarks had nothing to do with electronics in the ballistic-missile program, and I could not have answered that question in public had they asked me. We were talking about technology across the board at the time.

Mr. WEISL. In what field of technology relating to military weapons are we ahead of Russia in electronics?

Mr. QUARLES. I would say that taking it as a whole, we are ahead of Russia today in military electronics, taking it as a whole and not without some exceptions.

Mr. WEISL. In what field? I mean in what specific field?

Mr. QUARLES. I think I would prefer to go into that in executive session.

Mr. WEISL. Very well. And you stated that we were head in atomic weaponry. What did you mean by that, Mr. Quarles?

Mr. QUARLES. Well, I meant just what the words say, that I felt that our whole atomic-weapon position as of this moment is a stronger position than theirs.

Mr. WEISL. In what respect?

Mr. QUARLES. I will be glad, if I may, sir, to discuss that in executive session.

Mr. WEISL. You want to do that in closed session. Then you stated that we were ahead in many branches of aviation. Did you mean military aviation or civil aviation?

Mr. QUARLES. I was speaking of military aviation, although I do not think I would have needed to pin the thing down precisely. I would still make it as a statement, and I think that we in this context should probably discuss it as military aviation.

Mr. WEISL. Can you say without violating security in what field of military aviation we are ahead of the Russians?

Mr. QUARLES. I can say, and again would ask your permission to amplify it under other circumstances, I would say that as of this time, in my opinion, we have the qualitative lead on the Russians in military aviation.

Mr. WEISL. In what?

Mr. QUARLES. In military aviation. And I am not breaking it down by types at this time, if I may, sir, and I should say, too, that I am not claiming qualitative superiority in each field of military aviation. I am taking an across-the-board appraisal as well as I can make it.

Mr. WEISL. The Russians have made great advances in jet engines, have they not?

Mr. QUARLES. They certainly have; yes, sir.

Mr. WEISL. Do they have jet engines of greater power than ours?

Mr. QUARLES. They have jet engines, individual jet engines, that have greater thrust than any standard engines that we have; yes, sir. This, however, deals merely with one characteristic of the engine, namely, its thrust, and does not by any means speak to the overall quality of the engine.

Mr. WEISL. May I ask, Mr. Quarles, whether in 1956 at the air-power hearings you testified that the Soviets had more combat planes than we?

Mr. QUARLES. I think, Mr. Counsel, that that record was finally straightened out to this general effect; that of advanced jet aircraft in combat units, they do have more. Of such aircraft in inventory, they do not have more. One has to be very precise in the way this question is asked in order to be sure that you are not misleading in the answer, and I believe that the record at that time was finally straightened out to distinguish between combat units in inventory and to distinguish between one air force versus the other, for example, and our total national position versus theirs and our total free world position versus theirs.

But it is true that if you state the question narrowly, you have to answer it that they have more modern jet aircraft in combat units than we have in the United States.

Mr. WEISL. May I read from the record, Mr. Quarles?

Mr. QUARLES. I would appreciate it if you would.

Mr. WEISL (reading):

The Communists are producing far more combat airplanes than we are.

This was in the summer of 1956.

Mr. QUARLES. You are speaking now, sir, about their rate of production, and I thought you were speaking——

Mr. WEISL. No. I am quoting the record of the hearings before the Subcommittee on the Air Force, page 1549. Now, maybe the report is wrong. But I am reading correctly from it.

Mr. QUARLES. Yes, sir. I submit that the words you read, which are undoubtedly my words, dealt with the rate of production and not the number of aircraft either in inventory or in combat units. That is the distinction, Mr. Counsel.

Mr. WEISL. And then you further state: "Even more important, if being ahead is related to the rate of progress"——

Mr. QUARLES. Are you sure you are quoting me, Mr. Counsel?

Mr. WEISL. I understand that this is your corrected record.

Mr. QUARLES. It sounds to me very much like General Twining's testimony at that time. However, I must say that aside from emphasis, I would agree with the testimony.

Mr. WEISL. There was another statement made in that record with which I understand you agreed. If you did not, why certainly you can say so: "One of the reasons that we are dropping behind is that the Communists are making scientific and technological advances at a faster rate than we are."

Mr. QUARLES. General White said that, and in specific context I agree.

JUSTIFICATION OF HIS POSITION

Mr. WEISL. You said that in 1956, and yet in this public television appearance, you gave the impression that we would have to search pretty far afield to find any technological field in which the Soviets were ahead of us.

Mr. QUARLES. I think these statements in context are not inconsistent, Mr. Counsel. One deals with their rate of progress. The other deals with their static position.

Mr. WEISL. Is not a combat plane a technological feat?

Mr. QUARLES. I can only answer that "Yes," but I do not quite see where that question leaves us, because it is not the type of progress that I was referring to.

Mr. WEISL. The only reason, Mr. Quarles, I am asking these questions is to illustrate why the public might have been led to a feeling of complacency when in November of this year, after sputnik was placed in orbit, a half-ton object, a half-ton satellite projected in orbit, you said that we would have to "look hard to find fields in which they were definitely ahead of us," except, you stated "in certain satellite areas," and then you said that we were ahead of them in electronics, in atomic weaponry, in many branches of aviation.

Mr. QUARLES. I submit, sir, that none of the fields that I mentioned as being ahead of them had anything to do with the fields they employed in launching their satellites. And I admitted frankly, that they had established a clear superiority to us in relation to satellites. I do not again find any inconsistency in those phrases.

Mr. WEISL. And again on November 18, Mr. Quarles—that is the trouble when we make public speeches—

Mr. QUARLES. It is, indeed.

Mr. WEISL. You stated in a speech to the Wings Club, that was November 18, about a week ago, that you found no cause for alarm "in the existence of the Russian satellite," and that "it is imperative that we not be sidetracked from our prime security objectives by extraneous or irrelevant issues."

Do you believe that Sputnik I and II are extraneous and irrelevant issues to the security of the United States?

Mr. QUARLES. No, I do not, and I do not think if you read my whole remarks at that time you would so construe them.

I do believe, however, that to respond to Sputnik I and II by a lot of the kinds of projects that have been proposed as a response would be, at least some of them would be, extraneous to and for that reason perhaps harmful to our more essential programs.

Mr. WEISL. Do you not think—and I may be wrong, it is just a question of opinion—it would have been better to arouse the people to a sense of urgency rather than to give them a feeling of complacency?

Mr. QUARLES. Mr. Counsel, I would appreciate it if you would put my whole speech in the record, because if my speech had any purpose whatever, it was to arouse, and I think it is fair to say that it did do so.

Mr. WEISL. You did say this in that same speech, and I quote, referring to the satellites or to the Russian sputniks:

They are a significant technical achievement, significant in themselves and significant as an indication of the state of advancement of their military rocketry. It is no disparagement then to say that they have little or no other military

significance. They do not prove that the Russians are more advanced in military rocketry than we are. Even if they did, this would be a minor rather than a major factor in the near-term balance of military power.

Mr. QUARLES. Those words were all said with great deliberation and I stand by every one of them.

Mr. WEISL. I am sure you do, and I am sure you were sincere and made them in the best of spirit. But doesn't that give the listener a feeling, well things are not so bad, these things are up in orbit but they have very little significance?

Mr. QUARLES. I think if you took the sentence that you quoted out of my speech and made a speech of those sentences only, you might very well have left that impression.

Mr. WEISL. I read the speech. I do not want to read the whole speech now, but I did read the speech, Mr. Quarles, and I discussed it with my associates and discussed it with others who heard the speech, and they all felt that while you were entirely sincere, it did give a feeling of complacency to the listener.

In other words, they said: "Well, these things did happen, they did put a half-ton satellite in orbit, but it has little significance as far as our overall military protection is concerned."

Mr. QUARLES. We have to stand on our professional judgment in matters of this kind, Mr. Counsel, and I stand on mine. I think that a great many people around the world are anxious to have a fair appraisal of this situation, and I think, that as I attempted to make clear before we started, that it is very important to leave this in a correct and balanced place rather than creating impressions.

Mr. WEISL. That is what I feel we ought to do: that it ought to be in the right balance today but certainly all of us here, I know that the members of the committee, after hearing the evidence that we have heard, are tremendously aroused over the potential threat.

HE IS AROUSED, ASSERTS QUARLES

Mr. QUARLES. I doubt that any member of the committee is any more aroused about the threat than I am, Mr. Counsel.

Mr. WEISL. And we feel that the public must be aroused in order to understand the danger that exists, so that they will make the sacrifices that are necessary to meet that danger. And you are aroused, I am sure, Mr. Quarles, or are you aroused?

Mr. QUARLES. I have just stated that I was at least as aroused as any member of the committee, Mr. Counsel, so I guess that is an answer to your question.

Mr. WEISL. I can assure you that the committee is——

Mr. QUARLES. Pretty aroused.

Mr. WEISL. Very aroused. It is determined to get every fact that is material and try to do something about it. I do not want to belabor these statements, Mr. Quarles, and I will not read all of them. I will just read another one.

On September 9, 1957, you addressed the United States Conference of Mayors in New York. That was when the Soviets announced that they had made a successful test of an ICBM. You were quoted as having said, and I quote:

It is my feeling that the military significance of this particular phase of the competition has been exaggerated

Mr. QUARLES. That is one of the sentences in my speech in New York. I agree, sir.

Mr. WEISL. Do you think that that gave the people or the mayors who listened to this a sense of urgency about the situation?

Mr. QUARLES. That sentence taken apart from the rest of the speech would undoubtedly not have given them that sense; no.

Mr. WEISL. What was there in the rest of the speech?

Mr. QUARLES. Well, I guess the speech has to stand on its own record. I think you will find that the speech had no quality of complacency, if you take it in its entirety.

Mr. WEISL. It just seems to me that if a man of your position in Government and your ability as a scientist and a technologist, states to the mayors of this country that it is your feeling that the military significance of an ICBM test by Russia has very little military significance, or that it is exaggerated, that does give a feeling of complacency.

Mr. QUARLES. I am sure you did not mean to put in the "very little" significance.

Mr. WEISL. No, no. I will quote it exactly:

It is my feeling that the military significance of this particular phase of the competition has been exaggerated.

How can you exaggerate the military significance of a test by Russia of an intercontinental ballistic missile?

Mr. QUARLES. You can exaggerate it by failing at the time to take account of all of the other factors that do tend to make such a test as of this time relatively less important than it was being represented to be.

The other factors I have reference to are our very great manned aircraft striking power at that time, and the fact that such a test, and what we know about it, does not entitle one to believe that they have, either had at that time or will have in the near future, a striking power based on this kind of development.

I do, however, submit that I made it very clear that in this speech, as in every other one I have made, that the important thing to note was the rate at which they had moved forward, and that this was a challenge to us that was very important for us to meet.

Mr. WEISL. You stated, and I know you are sincere, that you are aroused and have been aroused at the danger.

Mr. QUARLES. That is correct, yes.

Mr. WEISL. Do you think that these quotations of yours that I have read would have a tendency to arouse the Nation to the danger?

SPEECHES EMPHASIZED CHALLENGE, SAYS QUARLES

Mr. QUARLES. I think the particular sentences you have quoted do not have that tendency. I still feel that the speeches had the quality that I have described of emphasizing the challenge to us and the danger looking down the road, the great importance of our maintaining the strongest kind of a military program applied to the highest priority need.

Mr. WEISL. But did we do that? Did we not make cuts in our military program during this period?

Mr. QUARLES. We have made cuts, certainly, in our military programs. We have not made cuts in the high-priority programs that

I referred to except in respect to the rate of production of such programs which were judged not to be important because it was judged by technical people that we were not ready for the production at that time.

Senator JOHNSON. Counsel, will you yield there?

Mr. WEISL. I will yield.

Senator JOHNSON. Mr. Quarles says that he is aroused, and he says that your quotation of selected sentences from his speech may not indicate in those sentences that he was aroused, but implies that there are other portions of the speech that were said and were calculated to arouse the country.

I wonder if Mr. Quarles would point out the paragraphs in the speech or the sentences in the speech which he feels were calculated to arouse his fellow Americans to the same extent that this committee is aroused. We will supply him with a copy of it and let him point out the parts of it that support his position.

Mr. QUARLES. I would be delighted to do that now, Mr. Chairman, or I will be delighted to do it for the record, since it would take a little time to do it.

Which would be your preference?

Senator JOHNSON. We will just submit it to you now.

Mr. WEISL. This is your speech at the Wings Club, and this is your speech to the mayors. And this is your television program of this November, 2 weeks ago.

Mr. QUARLES. Mr. Chairman and members of the committee, I read from my Wings Club speech, beginning on page 9 of the transcript for it or the record of it. I will read two paragraphs:

Perhaps the significant point here is that a nation with only a fraction of the industrial strength and resources of our own can, with its ruthless dictatorial system of government, make impressive progress along the lines in which they choose to concentrate their efforts.

We can deplore the sacrifices their people are called on to make, but we must not fail to meet the competitive challenge. It will be costly and call for sacrifices on our part in the form of personal effort on the part of some and greater tax burdens than we like to bear on the part of all. If we are at times annoyed by the sacrifices we must make, we have grounds for hope that those under the Communist yoke will become outraged by theirs. Our course seems clear to me. We must do whatever it takes to meet this situation. We must recognize our community of interest with our free world friends and allies. We must collectively with them maintain adequate deterrent forces in instant readiness. We must plan our own programs for the long pull, so that military superiority will not be undermined by economic insecurity. We must strengthen our foundations in the field of scientific and technical training and in basic research, and specifically we must broaden and deepen our programs for the exploration of outer space. We have the capacity to meet this challenge and still enjoy the highest standard of living that any people have ever enjoyed. My belief is that we would want to meet the challenge even if the standard of living had to suffer.

Shall I quote any of the other speeches, Mr. Chairman?

Senator JOHNSON. Yes; I would like you to quote everything that in your opinion supports your position that those speeches were calculated to arouse your fellow Americans, because that is your position, and as I understand it, your testimony is that you are aroused as any member of this committee and that what you were saying was calculated to arouse others.

And I want to, in fairness to you, have you substantiate by quotation what you have contended in your oral testimony, by referring to any statements you made urging a speedup of action or an

acceleration of progress or a stepped up program, once it was determined that we were coming out second best.

Mr. QUARLES. Of course, with a little more time, one could perhaps do a better job.

Senator JOHNSON. I assume you are familiar with your own speeches.

Mr. QUARLES. That is very true, Mr. Chairman, but I am not familiar with picking out sentences at a time.

Senator JOHNSON. You take such time as you may need. We are not going to rush you.

The whole point in asking you to do this, is that counsel has made his point and I want you to make yours, and then let the committee and the country judge.

Mr. QUARLES. I certainly appreciate it, Mr. Chairman.

Senator JOHNSON. There is a great feeling, I think, in the committee and in the country, that there has been nobody in a real hurry about this whole situation and there has been a lot of public officials who have been making statements which are calculated to laugh the whole thing off.

And if it has been your feeling that the people should be aroused to greater effort, to greater expenditures, to an acceleration of the program, to a speedup of the whole thing, if you have said anything to justify that position, I want it in the record so that he who reads can judge.

Mr. QUARLES. Thank you, sir. I certainly appreciate the opportunity.

In the Mayors Association speech, which was referred to, some considerable part of the speech was devoted to the programs of the cities which the mayor represented, and our appreciation for the fine cooperation we had from the mayors of the cities, so it is not really pertinent to the question to which we are speaking.

Senator JOHNSON. We make speeches to various organizations, and I am sure we appreciate that part of your speech.

Mr. QUARLES. I come to one place in the Mayors Association speech which is found in the middle of page 4, which says:

All of these things

and I had been referring to the announcement of the intercontinental missile test in Russia, the armament talks in London, the recent world events, particularly in the Middle East, the Defense budget requests and the congressional action thereon, the lively discussion in Congress and the press of our military assistance program—

All of these things have an important bearing on the problem of national defense. Pervading it all and in fact dominating some aspects of it is the phenomenal advance in science and technology as applied to the art of war, an advance that has had a truly revolutionary impact.

We don't have time here today to go very deeply into the foundations of this situation. Suffice it to say that the U. S. S. R. from a well behind start after World War II has pulled up into a challenging position.

We are no longer alone in having the ready capability of inflicting terrible damage on the enemy. We now must reckon with a similar, although not necessarily equal, U. S. S. R. capability.

For a decade or so after World War II, peace in the world rested primarily on the foundation of our retaliatory capability and our will not to use it unless attacked. From now on, peace must depend also on the will of a Communist power not to use its growing air atomic capability.

Without drawing any conclusions about the present peaceful intent or otherwise of this Communist power, it is my conviction, and I hope it is yours, that under such circumstances until there is something to take its place, our national security requires us to maintain a defensive retaliatory position that will at any point of time make it clearly unprofitable for the Communists to resort to aggression against us.

Intent, no matter how good, is too ephemeral a thing to rely on.

I think there are various other quotations, and unless you urge it, I would like to just say—

Senator JOHNSON. If that is your idea of a speech that is calculated to arouse people, that is calculated to spur them to expedite the existing program, to chart new courses, to outline new goals, to regain a superiority that has been lost, and you think you have got them whipped up into that state of mind by those speeches, then your evaluation of the effect of the speech is different from mine.

I think what you are saying may all very well be true. Nobody has any disagreement with it, but the net of it is, the American people can have adequate defense and eat their cake, too. They can maintain the high cost of living and eat their cake and have a little cream on it.

That is not my idea of the story that they ought to be told when things develop as they have developed in the last 2 months.

YOUNG PEOPLE ASKED PENETRATING QUESTIONS

Mr. WEISL. The Secretary did say, Mr. Chairman, in his speech at the Wings Club, that the standard of living might have to be affected to meet the challenge.

Now, in your speech to the young people over television, about 2 weeks ago, will you please point to something that you said in that little interview there in answering questions that it would arouse young people, the television audience, to a sense of urgency?

Mr. QUARLES. Well, as you well know, Mr. Counsel, in these television programs, you answer the questions you are asked and you try to make the point as well as you can.

Mr. WEISL. Yes, sir. I wish I could ask the questions as well as those youngsters asked the questions—

Mr. QUARLES. I agree with you, sir.

Mr. WEISL (continuing). On that program.

Mr. QUARLES. On the other hand, it leaves you feeling, at the end of the half hour, that you wish very much they had asked you some questions that they didn't ask that would have made it possible to make your point.

Mr. WEISL. But they did ask, Mr. Quarles, some very pertinent questions.

Mr. QUARLES. I agree they did.

Mr. WEISL. They asked you specifically what were we doing about Russia's threat, were we ahead or was Russia ahead of us. You said they were not ahead of us. They asked you whether they had a ballistic missile; how we stood, with reference to technology; how we stood with reference to science.

And at least you gave me the impression—I heard the interview, and I read the interview afterward—that the satellite did not really mean very much, just to show they might have had a little rocket engine that was strong; and that we were ahead of them in atomic weaponry, in aviation, in electronics.

If you wish to—now, certainly I do not want to belabor the point, Mr. Quarles, and I am sure the committee wants to be completely fair. We have been criticized, Congress has been criticized, for not arousing the people. Everytime I meet someone, they say, “Well, my God, we never knew about this.”

Senator JOHNSON. I should like to observe that I think the words in the speeches you quoted could be considered in the context of the official acts of cutting the military suit to fit the budget cloth.

THE BUDGET DID NOT COME FIRST, SAYS QUARLES

Mr. QUARLES. I believe you will find that no speech I have ever made has advocated that we cut our military suit to fit the budget cloth. That is not my belief. I have appeared many times before Congress and before the public on this matter, and I think the record will show that I have never on any occasion advocated that position, either before the Congress or the public.

Senator JOHNSON. And you believe that has not been the policy of the Department during the time you have been there?

Mr. QUARLES. I believe it has not been the policy of the Department. But that is a different question, Mr. Chairman, I think you will agree. I was speaking to my own responses.

Senator JOHNSON. Then the budget ceilings have had no such effect, in your opinion?

Mr. QUARLES. The budget ceilings, to the extent that there have been budget ceilings—and I think that word perhaps implies more than it should—but at any rate, I certainly agree that there have been fiscal limitations which have limited our programs. I do not agree that the programs were limited solely because of fiscal limitations. In other words, I believe there was an honest effort made to produce a sound defense, and certainly as far as I was concerned, that was the first requirement of the program.

Mr. WEISL. Were you surprised when the sputnik was launched?

Mr. QUARLES. No; I was not particularly surprised, Mr. Counsel. I was surprised at the particular day, but I was not surprised that the sputnik was launched.

Mr. WEISL. Were you surprised that it was launched ahead of ours?

Mr. QUARLES. That depends on the timing of your question, Mr. Counsel. At the time it was launched and within, let us say, weeks before that, I was well aware of the fact that ours could not be launched in this period, and I was quite conscious of the fact that theirs might well be launched.

Mr. WEISL. Do you think it was important that we launch ours ahead of theirs?

Mr. QUARLES. Yes, I do, Mr. Counsel.

Mr. WEISL. It was pointed out, Mr. Quarles, by a very important commission headed by a very prominent gentleman, that it was most important—

Mr. QUARLES. Well, I am not—

Mr. WEISL (continuing). To launch our satellite first.

Mr. QUARLES. I am not disagreeing with that, Mr. Counsel.

WE DID NOT START EARLY ENOUGH ON SATELLITES

Mr. WEISL. Could we have launched a satellite ahead of the Russians?

Mr. QUARLES. Had we started early enough, I think there is no doubt we could have.

Mr. WEISL. Didn't Dr. von Braun publicly state that he could have launched a satellite 6 months ahead of the Russians, but was stopped?

Mr. QUARLES. I am sure that he made such a statement, although I cannot quote it accurately. I agree with your statement.

Mr. WEISL. If he was stopped, who stopped him?

Mr. QUARLES. That is a question that one would have to answer carefully, because this is a matter of a number of years.

When he first made the suggestion immediately or a short time after World War II, I presume that he was stopped by the people who had power to stop him at that time.

When he made the suggestion in 1954, when we were first considering the scientific satellite program, he was not authorized to proceed with his satellite on advice of the best people we could get hold of to render advice at that time, because, in their judgment, there was more promise in an alternative way of doing the job.

More recently, he has again——

Mr. WEISL. I beg your pardon for interrupting you, Mr. Quarles.

Mr. QUARLES. Surely.

Mr. WEISL. But what was the alternative way of doing the job? I mean, does it make any difference how a satellite is launched in orbit, so long as it is launched?

Mr. QUARLES. Well, yes, I would say it makes a difference, although again I am not quite sure I am being responsive to your question there. I think the best I can do is to describe to you briefly the considerations at the time the Orbiter proposal of the Army and Navy together, in which Dr. von Braun and his people at Redstone were interested, was turned down in favor of the Navy program that has since come to be known as Vanguard.

This was on the basis of a very detailed study by the best scientists and technical people we could get, and it was their recommendation that we follow the Vanguard course as the more promising technical course.

WHY DID THEY DRAG THEIR FEET ON SATELLITE?

Mr. WEISL. Well now, Mr. Quarles, one of the leading committees headed by one of our leading scientists, appointed by the President, in their report stated that it was most important for us to launch our satellite ahead of the Russians. Admiral Bennett, Rear Admiral Bennett, of the Office of Naval Research stated that the Russian satellite should not have been a surprise, because the Russian magazine Radio announced that the launching was imminent in its June issue, even giving the frequencies to be used.

Now, if Admiral Bennett had a feeling—and he was the head of the Office of Naval Research—after reading this magazine that a Russian sputnik was to be launched sometime after June, that it was imminent, and we were apprised by one of our leading independent committees, appointed by the President, that it was most important to launch ours first, because of the psychological effect it would have throughout

the world and on our allies, why did we not let Von Braun launch it, or at least why did we not give Dr. Hagen priority when he asked for it?

Mr. QUARLES. Well, there are a lot of questions mixed up there, Mr. Counsel.

Mr. WEISL. Well, let us straighten them out.

Mr. QUARLES. The committee that you refer to made its report early in 1955. At that time the report was an endorsement of the scientific satellite program, and an urge, as you state, to move on with the program and get our satellite up before the Russians put theirs up.

So I take no exception to that. I can only say that as of that time, the best scientific advice we had was to the effect that that was our preferred course of action to get a satellite up. This was early in 1955.

Your next statement, sir, was that in the summer of 1957, Admiral Bennett, who was in charge of the Vanguard program, said that he knew from Russian publications that they hoped to get their satellite up early, and that it would have such-and-such frequencies.

That is true, and was, in fact, one of the things I had in mind when I said I was not particularly surprised about the result.

As of that time, there was no possible way that we could have proceeded, starting then, with any other course of action that would have been more favorable than the one we were on. So I do not see any inconsistency here, other than the fact that as we now look back on it all, we can see ways in which we all wish we had acted somewhat differently.

Mr. WEISL. I am not looking, and I am sure the committee is not looking, for inconsistencies. But certainly if an important committee, headed by one of our leading scientists, is appointed to look into this matter, and they say and they recommend that it is most important to get a satellite up ahead of the Russians, and if we could have gotten it up, as von Braun says, in 1956—von Braun says he was turned down twice in 1956, after we had a warning that the Russians were to put this satellite up.

Mr. QUARLES. I think, Mr. Counsel, that the sequence of events—

Mr. WEISL. I beg your pardon, sir?

Mr. QUARLES. I think the sequence of events was not quite as you have given them, because the warning of the Russian satellite and the timing of it were 1957 warnings and not 1956 warnings.

DEFENSE OF DECISION TO GIVE MISSILES PRIORITY

Mr. WEISL. Let us assume we did not have any warning, but it was important to get a satellite up ahead of the Russians. Then should we not have done everything possible to get the satellite up as quickly as possible?

Mr. QUARLES. I think that we should have done some things that we did not do to get the satellite up; yes, sir. I would like to add to that that I think it was a good decision then, and is still, in retrospect, a good decision to make it a condition that they not interfere with the top priority of the ballistic missiles program.

Mr. WEISL. How would that have interfered with the top priority of the ballistic missile when von Braun said he could use the Jupiter, as it then was, to launch a satellite?

Mr. QUARLES. When Dr. von Braun recently spoke—

Mr. WEISL. I am talking about 1956. He said he was turned down twice in 1956.

Mr. QUARLES. Dr. von Braun, in discussing the satellite, the Army satellite project at that time, was asked how much sacrifice we would have to take on his ballistic missile programs, and he quoted the 3-month delay.

We felt that it was not wise to buy the program at that kind of a price, particularly since at that time, as of that time, the Navy was still on a schedule with its Vanguard program that would have launched prior to the Russians.

Mr. WEISL. Well, you had a missile similar to the Jupiter in development during that period, namely, the Thor, did you not?

Mr. QUARLES. It was in early development in 1956, yes.

Mr. WEISL. And the Army was not going to use the Jupiter for its own purposes anyway; was it?

Mr. QUARLES. The Army at that time was developing the Jupiter for the Navy's use, and as a backup for the Air Force's land-based Thor development.

It still had top priority for those purposes.

Mr. WEISL. It has top priority for Navy use?

Mr. QUARLES. It did at that time have top priority for Navy use.

Mr. WEISL. How could the Navy use it?

Mr. QUARLES. The Navy was working on a ship-based adaptation of the Jupiter missile, and the whole purpose of the Jupiter development was to produce a ship-based version and a land-based backup for the Thor missile.

This, however, was changed, Mr. Counsel, at a later time, and the Navy proceeded on a separate course for a ship-based version of the intermediate range missile.

Mr. WEISL. Now, why was Dr. Hagen turned down when he requested priority to get his satellite in the air before the Russians? He was turned down first, he testified, in 1955.

Mr. QUARLES. I am not aware, Mr. Counsel, that Dr. Hagen's request for priority was literally turned down. I do not know that part of the record. I will have to supply it.

Mr. WEISL. You heard Chairman Johnson read the record to Mr. McElroy.

Mr. QUARLES. I only heard it today, sir, and I have not had an opportunity to examine into the events to know what happened in action on his request.

I will be glad to supply that, but I do not know.

(The Department of Defense report on priorities—Vanguard, see p. 208.)

Mr. WEISL. You do believe, however, that Dr. Hagen testified truthfully under oath; do you not?

Mr. QUARLES. I have no question about that.

Mr. WEISL. Now, turning back to long-range and intermediate-range missiles, in order to launch them, you have to have launching bases; do you not?

Mr. QUARLES. For the land-based ones.

Mr. WEISL. For the land-based ones. And we are talking about the Thor, the Jupiter, the Atlas, and the Titan.

Mr. QUARLES. That is correct; yes, sir.

Mr. WEISL. Do we have such bases now?

Mr. QUARLES. I would prefer to answer that question off the record, sir.

Mr. WEISL. How long does it take to build one of those bases?

Mr. QUARLES. Well, I think it would be better to discuss that off the record, too, because it depends on the kind of base you build, sir.

Mr. WEISL. Very well.

Can those missiles be used on mobile bases?

Mr. QUARLES. It depends upon the definition of the word "mobile," and in my definition, I will answer the question, "No."

Mr. WEISL. They cannot?

Mr. QUARLES. But I admit it depends on the definition of mobility.

Mr. WEISL. Is it desirable to have mobile bases to launch missiles?

Mr. QUARLES. I would say that it would be desirable if circumstances permitted you to do so in a practical sense; yes.

Mr. WEISL. Well, isn't it practical to have mobile launching bases for intermediate missiles?

Mr. QUARLES. It is not at the present time, with our present equipment and technology; no, sir.

Mr. WEISL. Then if the Jupiter people say that it is, Dr. von Braun, you would disagree with that?

Mr. QUARLES. I would have to sit down and examine the meaning of the word "mobile," and I might then disagree or we might merely agree that mobile meant different things to different people.

Mr. WEISL. Dr. Von Braun stated that the experience in the last war was that the Air Force, the American Air Force, knocked out all the stationary launching bases of the V-2, and knocked out very few of the mobile bases of the V-2.

Is that statement true?

Mr. QUARLES. I expect it is true, because I expect Dr. von Braun knew as much about that as anybody.

However, I would say that the inference that you draw from that World War II experience with chemical explosive warheads and the other characteristics of the missile, the inference you draw from that would be very misleading when you translate it into a world war III atomic situation.

Mr. WEISL. If it is misleading, can you straighten it out?

Mr. QUARLES. Yes; I think I can straighten it out in this sense: Under the circumstances which we think we will have to operate under, it is going to be necessary to get these things off very quickly, and it may even be a one-shot per launching pad kind of a thing, anyway. And fundamentally, the situation has changed because of the vastly greater power of each one of these, and because primarily they are stationed to deter others from launching an attack or to respond to an attack if launched.

It is a different situation, fundamentally.

Mr. WEISL. That straightens it out, does it not?

Mr. QUARLES. I think not too well. I will be glad to discuss it further in closed session.

Mr. WEISL. In closed session.

All I wanted to point out was that we wanted to be sure we would have launching bases when we had the missiles ready.

Mr. QUARLES. Yes, sir; and I agree completely.

Mr. WEISL. I am sure you want that and we will discuss that further, Mr. Quarles, in executive session.

Mr. QUARLES. Thank you.

COMPLEXITY OF THE PENTAGON ORGANIZATION

Mr. WEISL. Now, a great deal has been said about the complexity of the organization in the Pentagon, in the entire military organization and in the time that is spent between starting a thing and getting it done. You have seen these charts that have been published in the papers.

Mr. QUARLES. Yes, sir; I have.

Mr. WEISL. Have you anything to say which would enlighten this committee in that respect?

Have you any recommendations to make?

Mr. QUARLES. Well, I can say that I think it is very important for us to keep an open mind and keep a critical attitude toward our organization, and to keep trying to improve it. So I would not for a moment wish to be construed as feeling satisfied with organization in the Pentagon or in the Military Establishment as a whole.

Mr. WEISL. Has that complex organization slowed up the missile program, in your opinion?

Mr. QUARLES. Since the long-range ballistic missile program was given its top priority, and expediting measures were established for the program, there has not been a holdup of that program due to organization. Although even here one has to be careful because obviously if we had a completely streamlined program that did not have to worry about money and accounting or a lot of other things very possibly we could have moved more rapidly; but this is not being realistic and answering your question as realistically as I am able to, I would say that organization has not in a practical sense slowed up the long-range ballistic missile program.

The Army's tactical missile program may very possibly be able to show places where it had been slowed up.

I cannot cite such a place, but I can believe it might have, and I would say, taking missiles and research and development broadly one would have to say that they have not progressed as rapidly as best organization should have made them progress.

Mr. WEISL. Must we be resigned to the fact that the organization must be as complex forever as it seems to be and as it seems to appear?

Can we do nothing about that, Mr. Quarles, must we have—for instance, how many committees are there under Mr. Holaday to advise him—he is the missile Czar, so to speak. He is the Director of Guided Missiles.

Now how many committees are there under him that he has to consult with and advise him.

Just name the committees.

Mr. QUARLES. I will be glad to, sir.

There are two committees that serve Mr. Holaday and his missile field.

One of these is an internal committee that is known as the Office of Secretary of Defense Ballistic Missile Committee.

The other is a Science Advisory Committee which is advisory to Mr. Holaday.

Mr. WEISL. What about the Joint Coordination Committee for Guided Missiles.

Mr. QUARLES. This is not in Mr. Holaday's ballistic-missile area. I have to be careful here because as of 10 days ago or whenever

the new directive was issued, Mr. Holaday took over the whole guided-missile program.

Up to that time he had dealt primarily with the high-priority programs.

Mr. WEISL. But Mr. Holaday is supposed to be the Director of Guided Missiles.

He is supposed to have the power of the Secretary.

The President said that he is supposed to be, in plain language, the boss of guided missiles.

Now here is a Joint Coordinating Committee for Guided Missiles that Mr. Holaday has not anything to do with.

Now with whom does this Joint Coordinating Committee for Guided Missiles consult?

What is that for?

What do they do, if they don't consult with the boss of guided missiles?

COORDINATING COMMITTEE NOT FUNCTIONING NOW

Mr. QUARLES. I will have to say first, Mr. Counsel, that since Mr. Holaday has been the Director of Guided Missiles, there has not been a separate Coordinating Committee on Guided Missiles.

You are dealing here with two different time periods.

During the time in which he had only part of the guided-missile responsibility, the part that he did not have was under the Assistant Secretary for Research and Engineering, and that Assistant Secretary, for his part, had a Coordinating Committee on Guided Missiles.

Since Mr. Holaday was made Director of Guided Missiles and given the whole field, assigned the whole field, he has taken over the area previously covered by the committee you mentioned, the Coordinating Committee on Guided Missiles.

Mr. WEISL. So that no longer exists?

Mr. QUARLES. I will have to ask Mr. Holaday whether he has continued to use it or whether—in any event it is under Mr. Holaday.

Mr. Holaday tells me they are in the process of cleaning up their work because it was a going concern when he took it over.

Mr. WEISL. Who appoints the Ballistic Missile Committee?

Mr. QUARLES. The OSD Ballistic Missile Committee is a group of the responsible officials of the Department, the Comptroller, the Assistant Secretary for Properties and Installations, and other people of that kind brought together to expedite their action on their phases of the missile program.

That is to say, the Comptroller is brought in so that when a program proposal is made he can pass on the financing aspect of the thing without having to take it for processing it in his organization, and similarly the installations man covers the provision of the new facilities that have to be provided.

It is merely an expediting arrangement to avoid normal staff actions and the necessary delays in the normal staffing of projects of that kind.

Mr. WEISL. How often does this committee meet?

Mr. QUARLES. On call and on need but I will have to ask Mr. Holaday that question.

Mr. WEISL. We will ask Mr. Holaday.

Mr. QUARLES. Thank you.

Mr. WEISL. What about the Scientific Advisory Committee for Ballistic Missiles?

What does that consist of?

Mr. QUARLES. That is a group of scientists and engineers and people in industry who are familiar with the program who are called in as consultants to study the program in its technical aspects, and who recommend to Mr. Holaday and the Secretary of Defense technical courses of action in the program.

It is entirely an advisory group serving the program and their country as well as they can, to make the best of it.

Mr. WEISL. Who appoints that committee?

Mr. QUARLES. The Secretary of Defense appoints them although you could properly say that Mr. Holaday appoints them.

Mr. WEISL. Then there is the technical advisory committee panel.

What is that?

Mr. QUARLES. Well——

Mr. WEISL. I guess that is an advisory panel on aeronautics.

Mr. QUARLES. There might be either of two things that you refer to there, Mr. Weisl and I am not quite sure which you are.

There is a technical advisory committee on aeronautics that deals with aircraft programs and problems in an advisory sense, and then in this satellite field, there is a special advisory group.

But that is in relation to space programs.

Mr. WEISL. Is there such a thing as a Thor-Jupiter Committee that is described in this chart or has that been done away with?

Mr. QUARLES. The Secretary of Defense in August appointed Mr. Holaday and the two officers in charge of the Thor and Jupiter programs respectively, General Schriever and General Medaris, to perform the specific task of deciding which program should be continued; and actually they were unable to make a choice for technical reasons.

So the committee continues until a choice or determination can be made.

Mr. WEISL. Now then, in addition to Mr. Holaday who is the Director of Guided Missiles, each service has its director of guided missiles?

Mr. QUARLES. I think not literally, sir.

I think each service does, however, have its ballistic-missile programs.

I don't know——

Mr. WEISL. Don't they have a head of a ballistic missile program in each service?

Mr. QUARLES. Other than the Secretary of the Department, who is of course the chairman of their respective ballistic missile groups——

Mr. WEISL. Let us take the Army Jupiter program—who is the head of that?

Mr. QUARLES. As a specific program in the Army, General Medaris is the head of it, but of course he is subordinate to the officials of the Army.

Mr. WEISL. He is subordinate to whom?

Mr. QUARLES. Well, he is subordinate to a number of people in the Army; and I am not sure I can trace the whole chain of command, but he is subordinate of course to the Secretary of the Army, and to

others in line under the Secretary of the Army. I will be glad to supply that for the record; I cannot give it to you now.

Mr. WEISL. Yes, sir.

(The Department of Defense memorandum on the chain of command relating to the Army Jupiter program is as follows:)

Major General Medaris is the commanding general of the Army Ballistic Missile Agency, the Agency charged with the development of the Jupiter IRBM missile system. Stated briefly, General Medaris' command channels for the execution of the Jupiter program are: Commanding general, Army Ballistic Missile Agency; to Chief of Research and Development; to Secretary of the Army; to Director of Guided Missiles, Office, Secretary of Defense.

The organization for direction and technical supervision of the Jupiter development program may be described in more detail as follows: General Medaris, as commanding general, Army Ballistic Missile Agency, is directly under the Army Ballistic Missiles Committee. The Army Ballistic Missiles Committee is actively chaired by the Secretary of the Army. Lieutenant General Gavin, the Chief of Research and Development, is the senior military member of the Army Ballistic Missiles Committee, and as such is authorized to act for the Chief of Staff, Department of the Army. The Army Ballistic Missiles Committee is, in turn, directly under the Office, Secretary of Defense Ballistic Missiles Committee, chaired by Mr. Holaday, Director of Guided Missiles.

CHAIN OF COMMAND FOR MISSILES IN AIR FORCE

Now who has charge of the Thor program in the Air Force?

Mr. QUARLES. The Thor program, again, is part of the assignment to General Schriever who is in command of what we for a long time knew as the Western Development Division, which was given a project responsibility for the Air Force ballistic program.

Mr. WEISL. To whom does he report?

Mr. QUARLES. General Schriever reports through the commanding general of the Research and Development Command, to the Chief of Staff of the Air Force.

Mr. WEISL. Whom does he take orders from?

Mr. QUARLES. Well, he takes orders from the Secretary of the Air Force as transmitted to him, either directly or through channels.

Mr. WEISL. Who has charge of the intercontinental ballistic program, take the Atlas?

Mr. QUARLES. General Schriever and the answers are exactly parallel. I thought you were speaking of—

Mr. WEISL. And the Titan and the Atlas are exactly parallel.

General Schriever is in charge under the Chief of Staff of the Air Force, and he is under the Secretary of the Air Force?

Mr. QUARLES. All three of those programs.

Mr. WEISL. And he takes his orders from General White or the Secretary of the Air Force?

Mr. QUARLES. That is right, sir.

Mr. WEISL. Now then, what about the Navy Polaris program. Who is the boss of that?

Mr. QUARLES. The Navy has an Admiral Clark who is responsible for their missiles program broadly; and under Admiral Clark is Admiral Raborn, who is in immediate charge of the Polaris program. Admiral Clark, in turn, has the same chain of command as the others that I have mentioned.

Mr. WEISL. And he takes orders from Admiral Burke who, in turn, is under the Secretary of the Navy?

Mr. QUARLES. That is technically correct; yes, sir.

Mr. WEISL. Then at the top of that is supposed to be Mr. Holaday who is the Director.

Now can he give orders to the Secretary of the Navy or the head of the Navy or the Secretary of the Army or the head of the Army missile development?

Mr. QUARLES. He can give direction to them which has the quality of an order; yes, sir.

Mr. WEISL. I see. I think Secretary McElroy testified in his interview he said that Mr. Holaday did not have the right to order the various branches of the military services in their guided-missile program but we can ask Mr. Holaday about that.

Mr. QUARLES. All right, sir.

Mr. WEISL. When he testifies.

Mr. Quarles, could you give us your opinion of the bottlenecks that exist which tend to obstruct or delay the development of guided missiles?

ROCKET PROPULSION IMPORTANT OBSTACLE

Mr. QUARLES. I think Mr. Weisl, if you put those in two categories, one would be the technical obstacles that have to be overcome in perfecting these weapons systems, and they are extremely complicated technically, and there is a very great amount of research and development to be accomplished in perfecting them.

In that area, if I am addressing myself to your question to cover the technical area, I would say that the principal obstacles have been, first, the development of reliable and powerful rockets for the propulsion of such systems.

Second, the development of aerodynamic means of control of these rockets while they are in the atmosphere, and in fact in some degree while they are in outer space, and the guidance systems involved in controlling their flight and putting them on target, and finally, the reentry problem of bringing the payload back down through the atmosphere, and, of course, the very important problem of developing a payload that will be powerful and also of such characteristic that it can be carried.

Mr. WEISL. Are you through?

Mr. QUARLES. Yes; but you wanted to be sure that this last point was made.

Mr. WEISL. Are there any other bottlenecks that you know of?

Mr. QUARLES. I would say that in the ballistic missile program these are the technical bottlenecks. In this program, I think that the funding and the priority of the support has not constituted a bottleneck although this would be true, I should say, in a complete sense only of these highest priority programs, sir.

Mr. WEISL. Have you any recommendations to make to the committee as to how some of these bottlenecks could be removed or how the program can be expedited?

Mr. QUARLES. We do have recommendations, Mr. Counsel, about these highest priority programs, and they involve the construction, the expediting of the construction of bases, and now the expediting of production. These recommendations are now being formulated and will be brought to the Congress as soon as they can be. I would say that if you like that I could discuss that more in executive session but that is a general statement.

WHAT WAS THE RESPONSE TO URGENT AIR FORCE PLANS

Mr. WEISL. I want to turn to another subject, Mr. Quarles, if I may.

You told the chairman and told this committee that you did feel a sense of urgency. That you were aroused over the present danger that we face, and have been aroused for some time and I am sure that you have been.

Now I have read hundreds of pages of testimony given to Senator Symington's committee and other committees, and in each of these hearings men from the Air Force have appeared, and they have stated in no uncertain terms that they need a dispersal of their bases in order to protect them. They need better pay for the airmen who fly these planes.

They must give better incentives to hold the men in the Strategic Air Command. That they need better housing for them. They need to get more and better planes and men to equip them and work on double and triple shifts to be ready, and be in the air as much as they can so that if the enemy should strike they will be in the air to strike back.

Now I have searched to find out whether anything has been done about those urgent, urgent requests by men like General LeMay, General White, and General Power in the Air Force.

What has been done about that?

Has all that testimony, all that pleading to keep that Strategic Air Command at its maximum efficiency been in vain? What has been done about it?

Mr. QUARLES. We presented to the Congress in 1956 a supplemental request for appropriations to initiate and to expedite the dispersal of the strategic bombers, and the Congress appropriated the funds requested and the program was carried forward at that time. We have that dispersal program underway today. We are actually, in one of our proposals to the Congress that we will make in January, going to ask for additional funds to further expedite and complete that program, as we see it.

This is merely—this merely addresses itself to the one point of dispersal of the heavy bombers.

There is another program which they have been very anxious to get for the dispersal of their tankers north, and this program is also being formulated for the expediting of this program, the program has been under way; the expediting of it is being formulated for its presentation to Congress.

Mr. WEISL. We do hear, Mr. Quarles, constant statements about expediting and furthering, hoping and presenting, but nothing seems to get done. These bases are not dispersed; these men are not being kept in the service.

The Strategic Air Command keeps losing its young men. It is not in the air enough to be on the alert constantly.

The men are not being paid enough to have an incentive to stay. They don't have the housing that they ought to have to make them happy. They do not have the hospitalization that they need to protect their families, and what we hear is what you have said: "We are expediting; we are going to present; we are hoping."

Now when will we get these thing done, Mr. Quarles?

Mr. QUARLES. I think, Mr. Counsel, we will never get the building of a military establishment done. At any time we approach the problem there will be things that we ought to do.

However, if we like to deal with specifics, I will be glad to supply for the record the extent to which dispersal bases have been created, and the extent to which the dispersal and moving north of the tankers have been gotten under way.

(The Department of Defense memorandum on Strategic Air Command dispersal is classified secret and is included in the classified record.)

There is one other matter that you referred to that I should have spoken of earlier.

This is the better treatment of our personnel, and particularly the better treatment of those highly skilled personnel that are vital to our success in running this business, and we will present to the Congress a program that is commonly known as the Cordiner program, to accomplish that purpose.

CORDINER PROGRAM RECOMMENDED

Mr. WEISL. You will recommend the Cordiner program?

Mr. QUARLES. That is right, sir.

Mr. WEISL. Why was it turned down before?

Mr. QUARLES. The Cordiner program was turned down for congressional action last year on the belief that it was not a good time to propose the action.

Whether that was right, wrong, or not, I can only say that I personally will be in strong support of the Cordiner program as soon as the Congress can see fit to consider it.

Mr. WEISL. Has that been cleared with the Budget Bureau and the President?

Mr. QUARLES. My statement is that we will present it, sir.

Mr. WEISL. And with the support of the President.

Mr. QUARLES. Well, we could only present the matters with the support of the President.

Mr. WEISL. Very good.

We have been advised by very knowledgeable and important people who know Government, know procurement practices that one of the great problems is the long lag between the time that a development idea is conceived and the authorization for design work.

I am told that it takes some times as much as 5 years to get a development idea into a design.

Is that true?

Mr. QUARLES. That is true, yes, sir.

In fact at times——

Mr. WEISL. Why does it take that long?

Mr. QUARLES. It depends entirely on the kind of design you are trying to produce.

Mr. WEISL. Let's take some specifics.

When was the idea of the Atlas first conceived, the long-range intercontinental ballistic missile?

Mr. QUARLES. First conceived in 1946.

Mr. WEISL. When was the first design granted?

Mr. QUARLES. First design granted?

Mr. WEISL. First design made, I mean.

Mr. QUARLES. Well, the first design of a complete weapon was made, I would say, within the last year or two and I wouldn't like to be more specific than that at this meeting.

Mr. WEISL. In other words, from 1946 to 1956?

Ten years to get what was then accepted as a good idea into work?

When was it first put into work? Let's start that way. It was conceived in 1946?

Mr. QUARLES. It was put into contract either in 1946 or 1947. I don't remember which one.

Mr. WEISL. When was it put into work?

Mr. QUARLES. I assume you mean by put into work, put under contract. It was put under contract either in 1946 or 1947, and I will supply that for the record.

(Department of Defense subsequently furnished the following:)

The correct date is 1946. In that year the Air Force initiated a program for a study of rocket missile capabilities, with the development of an intercontinental rocket as the final objective.

Mr. WEISL. What kind of a contract?

Mr. QUARLES. This was a research and development contract with Convair, the Consolidated Vultee Co.

Mr. WEISL. Was it, first conceived in 1946?

Mr. QUARLES. Well, conception of a thing of this kind is hard to pin down, sir. I don't believe I can answer that.

Mr. WEISL. Do you agree with this man's statement, and he is a knowledgeable man in government who states that sometimes a 5-year lag exists between the time that a development idea is conceived and the authorization for design work is granted.

Mr. QUARLES. I think that is very probably true, Mr. Counsel, and I think in fact you can find plenty of cases where authorization for design work has never been granted, because on analysis and best judgment it was not thought to be a wise thing to grant it.

Mr. WEISL. But suppose on analysis and judgment it is thought to be a good idea?

Mr. QUARLES. If it is thought to be a good idea and good in the sense that it is good enough to rate being done, then I think the granting of it is a matter of a very short time. But the problem here is not how long it takes to make a decision. The problem is getting enough information and understanding of the overall problem well enough to be sure that it is a thing that is wise to undertake.

Sometimes it gets to be wise to do later because the art has advanced to the point where it is practical and where it might not have been practical earlier.

CONTRACTS PROVIDE INCENTIVES

Mr. WEISL. We have also been advised that the relationship between the Government and the producers of weapons is such that there has been no way found to provide incentive to the producer to speed up production and cut costs.

Mr. QUARLES. Well, I have to disagree with that, sir. I think we do have ways for putting incentive into our contracts, and we, in all cases, try to write contracts with an incentive.

Mr. WEISL. What are those—I am sorry, sir.

Mr. QUARLES. It is difficult to do that on contracts where you cannot define the thing to be delivered well enough to be able to define the price and therefore the incentive.

However, where we are dealing with things that are definable, we always write into them cost-incentive features such as fixed price features where the profit depends on the contractor.

Mr. WEISL. Well, let's take the missiles field.

Suppose that supplier who is making the Thor delivers the missile 6 months ahead of time.

What bonus does he get for it?

Mr. QUARLES. In the case of the Thor: the Thor is contracted, as we see it, of necessity, on what we call a cost-plus-fee basis, where the contractor is reimbursed for his expenses, and this is done simply because neither he nor we could define ahead of time what the problem of producing a Thor would be.

This is inescapable under such circumstances but it is only typical of things that are so far out ahead of the established art that they cannot be defined.

Mr. WEISL. Let's forget about the established art. But suppose the fellow delivers that Thor ahead of time. Does he get some benefit for it? Is there any incentive for him to do it quickly? Does he get the same pay whether he does it quickly or does it slowly?

Mr. QUARLES. In the case of the Thor, Mr. Counsel, which was from the start a top priority project, the work that the contractor was called on to do, he was called on to do at the earliest possible time.

There has never been any way to define whether he was doing it earlier than he should or later than he should, because we credit him with the best possible effort in the field.

Mr. WEISL. Well, is there no way that you can give a man some incentive to do his work cheaper or better or more efficiently?

Mr. QUARLES. As I have tried to say, sir, there is a way we can do it; and we do do it in every case that we can find an ability to define the product to be delivered and, therefore, can define a price arrangement that gives him an incentive to a profit.

Mr. WEISL. Give us some illustrations where you do do it.

Mr. QUARLES. We do it, for example, in the production of aircraft after they reach a stage where the costs can be defined.

There are various forms of contract into which we write such incentives.

Mr. WEISL. Well, just tell us specifically, just what do you do? For instance, Boeing is making the B-52's. What incentive do you give Boeing to make the B-52 quicker?

Mr. QUARLES. I am not familiar with the Boeing contract in detail, and I may have to correct this for the record, but I will answer it as an example which is typical of such contracts where we have an arrangement under which the contractor does get a greater profit if he delivers at a lower than estimated price, and the circumstances determine how much of an incentive he is given in such contract.

Mr. WEISL. Who estimates the price?

Mr. QUARLES. The Government, and in this case the Air Force, is responsible for estimating the price.

Of course, this is done in best collaboration with the contractor, but it is the Air Force in this case, it is the Air Force's responsibility.

Mr. WEISL. Well, not to belabor the point, and not to continue the discussion, I will say to you categorically, we have been told by most suppliers that there is no incentive to do work quicker or better or cheaper, and no penalty for doing work slower or worse or dearer.

Now, if you can give us in writing some illustrations of how you control that, I am sure the committee would appreciate it very much.

Mr. QUARLES. I will be very glad to do so, sir; and I would like, in the meantime, categorically to disagree with such a statement. (Secretary McElroy's study on incentives and penalties, p. 203.)

Mr. WEISL. You have, though, admitted there is no incentive payment on Thor other than a cost-plus-fixed-fee contract, or any of the ballistic missile field.

Mr. QUARLES. I am quite sure as of today, that is true.

Mr. WEISL. Have you ever heard of Dr. Sterling Livingston, professor of the Harvard School of Business?

Mr. QUARLES. I have heard of him; yes, sir.

Mr. WEISL. Have you ever read his works on the incredible development of redtape in the United States Government?

Mr. QUARLES. I think I am pretty well aware of what he would say about it, and I think it makes very good reading, but I have not read it all.

Mr. WEISL. I see.

Is there anything that I have not asked which you feel I should have asked, or that you would like to say to the committee, or is there anything that you would like to correct?

Mr. QUARLES. Mr. Counsel, I think you have given me ample opportunity to make responses as I would like to, and I certainly appreciate—

Mr. WEISL. You have not been given ample opportunity?

Mr. QUARLES. No, sir. I say I think you have given me ample opportunity, and I certainly appreciate it.

Mr. WEISL. Thank you, sir.

Mr. QUARLES. May I add, sir, that counsel advises me that if agreeable to the committee, I would like to place the whole of the speeches we have been talking about in the record so it will be in there.

Mr. WEISL. It is entirely acceptable to counsel to place all of the speeches in the record.

Senator JOHNSON. Without objection, the three speeches referred to will be incorporated in the record.

Mr. QUARLES. Actually two. The transcript—

Senator JOHNSON. Two speeches?

Mr. WEISL. Two speeches, and a television interview.

Senator JOHNSON. Without objection, they will be incorporated in the record.

Mr. QUARLES. Thank you.

Mr. WEISL. Thank you.

(The documents referred to are as follows:)

ADDRESS BY HON. DONALD A. QUARLES, DEPUTY SECRETARY OF DEFENSE, BEFORE THE UNITED STATES CONFERENCE OF MAYORS, AT THE WALDORF-ASTORIA, NEW YORK, N. Y., MONDAY, SEPTEMBER 9, 1957

It is a great pleasure to be here with you and a high honor to take part in the program of this Conference of Mayors. I have had just enough experience in your business to have some understanding of your point of view and problems; and you are certainly vitally concerned with what I will call my business, although I realize as I say it that national defense is actually the business of all of us.

Before I tackle what one might call the global aspects of the defense business, I would like to speak briefly about some of the direct impacts of our current operations on the cities over which you preside. There is an almost endless list of such impacts so I will select only a few.

One that immediately comes to mind, and in which all of you are cooperating, is our Reserve program. As a matter of fact, the last time I had the pleasure of speaking here in New York was on Armed Forces Day when it was my pleasant duty to bestow on Mayor Wagner our Defense award for outstanding cooperation in the Reserve program, an award that some few others here in this audience have also received and that many others are no doubt becoming eligible to because of the generally fine cooperation we have in this field.

Then, too, I know that most of the cities represented here are hosts to one or more military bases or installations where the man in uniform comes in contact with your communities. To say that the soldier, sailor, or airman is just an American like all the rest of your citizens is to say the obvious, and still on analysis this is not quite as simple as it sounds. The man in uniform is set apart from other citizens by certain duties and obligations and by the very fact that, in greater or less degree, his service life forces him to be different. Let me say that I think we in the Military Establishment and you in your communities have made great progress in working out these community-serviceman relationships to the point where they are most wholesome and beneficial to the serviceman and I believe also most satisfactory to the communities. This has required the special thought and attention of the military, and it has also taken the organized and patriotic effort of many members of your communities, both within and without your official families. I am happy to have this opportunity to record our appreciation in Defense for the fine job that your communities have done.

Quite aside from community relationships, there are many matters of common concern to your cities and the Defense Establishment. For obvious military reasons, many of our installations are in or near large centers of population. In some cases, the densely populated areas have grown out toward military bases, and in some others our uses have changed to the point where municipal interests and military interests have clashed. The military, of course, have as their sole reason for being to serve the security of the people as a whole as well and economically as possible. In doing this, however, it is sometimes necessary to call on the local communities to make compromises or concessions to the larger national interest. I have in mind such things as airbases, missile sites, and the like. In this atomic age when security deals with the potential loss of millions of lives, we must not be prevented from building and maintaining the necessary defensive arrangements, even though these may involve potential hazards to local communities. We must, of course, minimize the hazards in every practicable way. Accepting these facts of life and standing firm and resolute in the face of them is just part of the toughness required of all of us in the period immediately ahead.

Another matter of great importance to some of your communities is the economic impact on them of military activities and procurement. There has been much public notice in recent months of retrenchments of various kinds in our national overall defense effort—closing some installations, canceling some projects, and stretching out others—to the degree that a false impression may have been created. These changes are an important and necessary adjustment, and there are a few communities that have been seriously affected by them, but we must keep them in perspective. We will still have a very substantial military program, and a very fine defense position. As I shall attempt to bring out a little later on, we must continue to have a very substantial program if we are to maintain a proper military posture in this dangerous atomic age. We must continue, that is, until such time as a new system of world law and order can take the place of this kind of security by armed defensive might. As to the economic impact of this adjustment I can only say that we in Defense are not only well aware of it, but we are also most anxious to minimize it. We hope it will be possible to make a downward adjustment, from last year's high level, of 5 percent or so in the overall defense expenditure without too drastic an effect on the economy as a whole, or even on individual communities where the effect is, of course, spotty; and this is what we are trying to do.

Perhaps with these examples I have taken as much time as I should on the municipal aspects of defense, particularly as I suspect I have already stimulated some broader questions, if not challenges, about some of its global aspects. This calls for some straight talk. I hope to strip it of any political entanglements.

In the backdrop for this part of my remarks we find such things as the recent Soviet intercontinental missile announcement; the disarmament talks in London;

recent world events particularly in the Middle East; defense budget requests and congressional action thereon; and the lively discussion in Congress and the press of our military assistance program. All of these things have an important bearing on the problem of national defense. Pervading it all, and in fact dominating some aspects of it, is the phenomenal advance in science and technology as applied to the art of war—an advance that has had a truly revolutionary impact.

We don't have time here today to go very deeply into the fundamentals of this situation. Suffice it to say that the U. S. S. R., from a well-behind start after World War II, has pulled up into a challenging position. We are no longer alone in having the ready capability of inflicting terrible damage on an enemy. We now must reckon with a similar, although not necessarily equal, U. S. S. R. capability. For a decade or so after World War II peace in the world rested primarily on the foundation of our retaliatory capability and our will not to use it unless attacked. From now on peace must depend also on the will of a Communist power not to use its growing air-atomic capability. Without drawing any conclusions about the present peaceful intent or otherwise of this Communist power, it is my conviction, and I hope it is yours, that under such circumstances and until there is something to take its place, our national security requires us to maintain a defensive retaliatory position that will, at any point of time, make it clearly unprofitable for the Communists to resort to aggression against us. Intent, no matter how good, is too ephemeral a thing to rely on.

This is not a new concept. It is, however, complicated, one might say even paradoxical, so it is apt not to be generally understood. In the preatomic era, with our sheltered geography, we could get by with the plowshare-to-sword-to-plowshare routine. Now our ocean barriers have largely disappeared. Defense and retaliation must be instantly ready. Given time to mobilize our industrial might after the conflict began, we have always been confident that we could win out. Now the situation is reversed. The industrial might must be applied in advance to keep the war from starting. The way to win all-out war is to prevent it.

That does not mean peace at any price. It means standing strong for an honorable peace—the only kind that can last. Such a need for military might at the ready, in the absence of war or even of war clouds, is new in our history. Our statesmen at the municipal level and at all other levels of our Government have, I submit, a solemn duty to see that the significance of these facts is understood by our people. The danger isn't that we will be attacked today, but that we will so lower our guard that we might be attacked tomorrow.

What military might is necessary and sufficient to keep up our guard and achieve this deterrent objective? No one can answer this question with complete finality. The answer certainly depends on what our competition does. It depends on science and technology and the energy and resourcefulness of each side in exploiting it. It depends greatly on our free world friends and allies and what they are able to contribute to free world collective security; and this in turn depends in good measure on the assistance we are willing to give them.

And, of course, maintaining peace is not the whole problem. We must preserve our freedoms and our economic vitality in the process. And similar problems exist in every other freedom-loving nation, so there is a very important place in this picture for our mutual security and economic assistance programs. This is the gist of the March 1, 1957, report of the President's Citizens Advisers on the Mutual Security Program. The seven advisers were headed by Mr. Benjamin F. Fairless, and I believe you would agree that they were all tough-minded, objective citizens without bias in the program. I would like to quote the two key conclusions of this report:

"Your Citizen Advisers therefore conclude, Mr. President, that a collective security program will be essential for some years to come. It is in our national interest to be a part of such an undertaking, and we recommend that the program be continued so long as present critical world tensions persist.

"To this end, the public must understand that the program is one of collective security and not just a program of aid."

I know of no thoroughgoing investigation of our collective security situation that has not reached substantially the same conclusions.

So, this is the essence of our problem. Now, just a few remarks about how we are doing.

First, a word about fiscal matters. The appropriations for national security have, I feel, been disappointing. The appropriations for defense account were some \$2.5 billion below the President's original budget request. The appropriations for military assistance and defense support to our allies, not including economic assistance, were some \$0.5 billion less than requested. Not all of

these were unilateral congressional cutbacks. Some of the cuts were accepted by the administration as the whole picture unfolded. But speaking broadly, the new defense and mutual security funds provided were some \$3 billion less than the original budget submissions to the Congress, and these submissions in turn were, of course, much lower than earlier departmental estimates. Perhaps the most disturbing aspect of the whole matter from my standpoint is the change in climate from last year, when \$900 million extra was added by Congress to the Defense budget to meet what Congress believed to be the national security problem, and this year when \$2.5 billion was cut from the budget request.

Fundamentally, this change in climate reflects a change in public estimate of our security position that, in my judgment, is not justified by the facts. If it should represent a first step toward typical postwar complacency, it would be very alarming.

Fortunately, or unfortunately, depending on how you look at it, we occasionally get helped out in these public relations matters by our Communist competitors. Events of the last month in Syria have shown a modern handwriting on those ancient walls. The recent Soviet actions in the London arms talks were characterized by President Eisenhower in these words:

"It is deeply disappointing to all true lovers of peace that the Soviet Union should have already attacked, with such scornful words, the proposals which Canada, France, the United Kingdom, and the United States are putting forward at the United Nations Disarmament Subcommittee in London. It is noteworthy that this attack coincides with the boastful statement by the Soviet Union that they have made advances in the development of means for bringing mass destruction to any part of the world."

This latter is a reference, of course, to the Soviet announcement claiming that they have tested an intercontinental ballistic missile. I would like to dwell a moment on the technical aspects of these claims and their relation to our own work in this field. First, one has to presume that the Soviets were not trying to improve our intelligence estimates of the progress of their work. On the contrary the presumption must be that they tried to give us as little information as possible and still achieve their propaganda objectives. A very careful reading of what they said confirms this theory. President Eisenhower called it a boastful statement, and this is exactly what I think it was—not in the sense of untruth, but in the sense of creating an impression that substantially exceeded the truth.

Let me elaborate. The two key paragraphs of the Soviet announcement were unofficially translated as follows:

"A super-long-distance intercontinental multistage ballistic rocket was launched a few days ago. The tests of the rocket were successful. They fully confirmed the correctness of the calculations and the selected design.

"The rocket flew at a very high, unprecedented altitude. Covering a huge distance in a brief time the rocket landed in the target area. The results obtained show that it is possible to direct rockets into any part of the world."

The phraseology is significant. It speaks of a single rocket that was launched a few days ago. The tests purportedly were successful and confirmed the calculations. The range was not disclosed, and the test results were not disclosed. The rocket met expectations and landed "in the target area," which is also not defined. This is the way we would describe a first experimental test, not necessarily even a prototype of a fully developed weapon. In our experience, it is a far cry from this to an operational weapon system.

According to the last quoted sentence, the results obtained show that it is possible to direct rockets into any part of the world. I would say that we already knew it was possible to direct rockets into any part of the world. The question is when will it be practicable to do so, and from just what launching points and with just what precision and reliability.

You can see that upon examination this Soviet announcement is most vague. Of course, we would all like to know just where their development stands as compared with our own. I want to make it clear that we have for some time credited the Soviets with substantial progress in the long-range ballistic missile field. We have also emphasized that our own work in this same field is being pressed forward on a broad front and with a high priority. Following the Soviet precept of not telling the competition any more than necessary, I can only say that after examining all the evidence, I am confident that we will not be outdistanced in this so called ballistic-missile race.

I would like, however, to emphasize the fact that even with an operational intercontinental ballistic missile system, it will be only one of the available means of delivering atomic destruction at great distances. And so long as we have

well-proven manned bomber systems that have the ability to penetrate and reconnoiter the target area, ballistic missiles will not even be the preferred method of accomplishing the mission. Therefore, while time differences in the ballistic missile race will probably not be very great one way or the other, it is my feeling that the military significance of this particular phase of the competition has been exaggerated.

Even so, our long-range ballistic missile program is continuing with a top priority. It has called for new development on a wide front. Progress has been generally satisfactory, although as in all cases, not uniformly so. It has been a very expensive program because we were buying time, for example, by duplicate approaches to some of the tough problems. Quite recently, we have been scrutinizing this along with all our other programs. We make no apology for any economies that we can achieve even in these very high priority programs. We do insist, however, that a sound defense comes first, and that economies must be made with due regard to the national security values involved. Moreover, we still do not expect to be beaten in this ballistic missile race.

In closing, I want to be sure to leave the record straight on one or two fundamental points. First, our clear long-range objective is a just and lasting peace, and our national purpose to work out the conditions for such a peace should be clear to all. Second, in striving for this goal we should regard military might as a deterrent to war, a holding action while the necessary adjustments are being made and an effective organization is worked out to replace deterrent might as the means of enforcing law and order in the international community. This will be a successful holding action only if our deterrent carries conviction to any potential aggressor that aggression would be disadvantageous rather than advantageous to him. In this terribly dangerous atomic age, it is clear that this is no time to be rattling our sabers. It is equally clear that world peace may well depend on our having here and in the free world as a whole a confidence based on capability and a determination to stand firm even when Communist sabers are rattled. This will call for strong nerves. Keeping our eyes on the ultimate goal, it will continue to challenge the best efforts of all of us.

REMARKS BY HON. DONALD A. QUARLES, DEPUTY SECRETARY OF DEFENSE,
BEFORE THE WINGS CLUB, NEW YORK, N. Y., MONDAY, NOVEMBER 18, 1957

It is a very great pleasure to be here with you this evening and a very great honor to be the recipient of the Wings Club Award of Merit. Reason, of course, tells me you have been overly generous in your appraisal, but I confess to you that something deeper in me than reason is touched by your kind words and warm welcome. My appreciation is all the keener as I look out over this audience and see so many whose esteem I would particularly value.

The first suggestion that I might join you here this evening came last May. Pleased as I was, there were so many uncertainties in my path between May and November that I had to beg for time. For one thing, I wanted to be sure that the vicissitudes of Washington life would leave me persona grata until the date of your meeting—a point you have been kind enough to resolve in my favor. The other uncertainty had to do with what we call the climate in Washington. On this point I decided late in August that the almanac forecast for November did not look too bad. All of which proves I was using the wrong almanac, because things certainly started happening shortly thereafter, which, even in Washington, would be called bad weather.

But it's an ill wind that blows nobody good so let's have a look at it. I hope I can clarify some of the issues that have been raised. At any rate, I can give you my own point of view about them, realizing that I have a very knowledgeable audience that will readily fill in any of the pieces that I have to leave out if I am to stay reasonably within bounds of your program this evening.

While the analogy is by no means perfect, one might compare the dawn of the space age, which we are now witnessing, with the period some 50 years ago when aviation was experiencing its early growing pains. I certainly would not prophesy that outer space activities in the next 50 years will parallel the phenomenal developments of air vehicles in the past half-century. On the other hand, I would not wish to play a role at this time comparable to the role played 50 years ago by those officials of the Military Establishment who took some time and had great difficulty in reaching the conclusion that aviation might possibly have some military value. The world has changed and we can no longer enjoy the luxury of that kind of cautious conservatism.

In addition to the impact of the completely unpredictable growth in aviation during this past period, the two world changes that most force our hand today are, it seems to me, the development of atomic explosives and, in the political field, the challenging position of the Soviet brand of monolithic and aggressive Communism. In combination, these things have revolutionized the world environment in which we must live and, at least in the defense business, our actions and reactions must be conditioned by them.

Before talking further about the new space age, perhaps we should define what we mean by outer space. For our present purposes I suggest we distinguish it from the airspace by noting that craft in outer space will be so little influenced by the atmosphere in the near vacuum in which they move that their motions will closely follow Newton's and Kepler's laws; whereas, aircraft will carry wings which depend on aerodynamic forces, not to mention the fact that most of the aircraft have air-breathing engines that depend on the oxygen in the air for combustion of their fuels.

This puts such things as the long-range ballistic missiles and the earth satellites in the space craft category, and I am sure you have been waiting for me to mention these items. While Sputnik I and II were by no means the first space craft, since many ballistic missiles launched by the Germans, Russians, and ourselves had preceded the satellites into outer space, the satellites are very significant in that their period of escape from the atmosphere is measured in days or months as compared with the few minutes of ballistic missile flight.

I trust that I have not offended your honorable organization by defining space craft in such a way as to outmode wings. I note, too, that one of your constitutional purposes is to "provide for the advancement and development of aeronautics, domestic and foreign," and I must invite your attention to the need for an amendment of your constitution to include astronautics as well as aeronautics; and further to remind you that outer space should be quite international in character so it would be anachronistic to refer to it as either domestic or foreign. If you would like a suggestion from the Pentagon as to how to get a constitutional change like this made on a timely basis, I would suggest that you appoint an ad hoc committee to study the matter.

I have now used up all my excuses to avoid talking about sputniks. You will understand my reluctance when I remind you that so far no one in the administration has yet succeeded in saying anything about sputniks that the critics didn't tear to pieces. Perhaps I should start off by admitting that I have long had something of a passion for astronomy; in a mild form, I am a star gazer; satellites affect me emotionally; and I can feel the allure of space travel, although not irresistibly, I must say. Moreover, I had enough information about our missile and satellite programs to be impressed by the Russian sputniks. They are a significant technical achievement, significant in themselves and significant as an indication of the state of advancement of their military rocketry. It is no disparagement, then, to say that they have little or no other military significance. They do not prove that the Russians are more advanced in military rocketry than we are. Even if they did, this would be a minor, rather than a major, factor in the near term balance of military power. There is a long step from the testing of such rocketry to the deployment of acceptably reliable, accurate, and therefore sound atomic weapon delivery systems based on rockets of intercontinental range. I have no doubt both they and we will develop such weapons, and I do not expect that there will be a significant time difference either way. The important thing to remember is that even after such weapons start to become available for some time to come thereafter, manned bombers will dominate the strategic delivery scene—and our strategic delivery position is now and will continue to be a sound deterrent position.

And so, when we place Sputnik I and Sputnik II in proper perspective, we must regard them as first and exciting probings into the mysteries of outer space. We must expect to see American satellites, as well as additional sputniks, orbiting in the reasonably near future. And, no doubt, satellites will get to be progressively more elaborate and sophisticated.

One rather important point that I alluded to earlier seems to have already been established by the fact that sputniks have now overflowed practically every nation on earth many times. This point is that outer space is international space, and that satellites traveling in orbit in outer space are not offensive in character and therefore do not violate the sovereignty of the nations overflowed. This is an important point and, as I said, one in which the sputniks have been very helpful.

I find in the existence of the first satellites no cause for national alarm. In this respect I am disagreeing with many people who have been saying "Let's beat

them"; "Let's put up a bigger satellite"; "Let's hit the moon with a rocket"; "Let's shoot something farther"; and "Let's reorganize."

May I comment briefly on this reaction. First, in this present technological competition it is imperative we not be sidetracked from our prime security objectives by extraneous or irrelevant issues. The overriding objective of our present effort must be to maintain adequate military forces in being—adequate to deter military aggression or to defeat its purposes if our deterrent should fail.

After all, we are facing the very real threat of existing Communist armed forces. Russia alone has more than 170 divisions; her western satellites have another 70; and the Communist Far East around 200—a grand total of around 440 divisions. When we add to this the Communist-bloc combat aircraft strength of more than 25,000, including the most advanced types, and her 500 submarines (the largest submarine fleet in the world), we see a very formidable immediate capability.

We must not be panicked or pushed into any sudden dispersion of effort which would scatter our talents and resources in an unprofitable or wasteful manner. We must not be talked into "hitting the moon with a rocket," for example, just to be first, unless by doing so we stand to gain something of real scientific or military significance.

When Sputnik II arrived, there was much clamor for drastic organizational shakeups and much talk about missile czars. Incidentally, there have been three men who successively occupied so-called missile czar positions in Defense. The first was Mr. K. T. Keller, who came in early in the Korean war buildup. He did a wonderful job of expediting important programs, but by his own choice he did it with substantially no formal delegation of power. Moreover, he insisted on being relieved when he felt that he had finished his job. He was succeeded in due course, first by Dr. Eger Murphree and later by Mr. William Holaday, both eminent in the field of science and technology. Both have done great jobs under a charter which, while somewhat strengthened, nevertheless continued to emphasize unseen rather than formal power. In order to make sure that Mr. Holaday's authority matches his great responsibility, the Secretary of Defense issued last week a new directive which made Mr. Holaday Director of Guided Missiles and placed him in solid charge of this program.

While organization is important, it has not, in my opinion, been a controlling factor in our long-range ballistic missile programs. For some time, these have been given the highest national priority. They are progressing well, and are substantially on schedule. As the President recently announced, our ballistic test missiles have made many successful flights to as much as 3,500 miles. Another series of rocket experiments in the Pacific achieved altitudes of over 2,500 miles. Unfortunately, some of our initial test missile facilities received so much publicity that they created an unduly pessimistic picture in the public mind. We have a strong program that we can be proud of.

I would like to remark on Russian ballistic missile claims and status. First, the fact that they claim a successful ICBM test does not necessarily mean they are anywhere near the time period when they will have operational units of inter-continental range. Their first very long range missiles were undoubtedly test vehicles as were ours. Their ICBM announcement and their later references to it have been most carefully worded to create the impression they wanted to create, and to avoid disclosing anything about the range, accuracy, or stage of perfection of the weapon.

It takes us years to produce a new weapon system like the B-52 bomber. The ballistic missile problem is even more difficult and takes even longer because of the many tough technical problems that have to be solved. The very size of the equipment and the test facilities adds to the difficulty. In our experience, there is a long time period between the first test firings and the final operational weapons. We have no reason to believe it is significantly different with them.

May I remark here on the frequently repeated view that the ICBM is the ultimate weapon. Whether it is ultimate no one knows. It certainly will not be a decisive weapon until a nation possesses proven operational missiles in considerable quantities. For many years to come, the manned nuclear bomber will be the primary deterrent weapon in our arsenal. This will probably also be true for the Soviets, despite their attempts to convince the world that manned aircraft are obsolete.

It is important that we undertake defense planning with two time periods in mind—first, today and the immediate future, and later that space era when long-range ballistic missiles are in operation, and other space projects of military importance are realities.

I believe there is no question that our near-term position is sound. Our concern is with the speed and scope of the Soviet progress. We must be aware of the challenge this holds for us in the future period. We, too, must push ahead on a broad front, with due regard to scientific foundations for the long-range effort. As the President brought out so well in his Oklahoma City speech last week, this calls for a new look at our educational system, along with increased emphasis on basic research. It is in this long pull sense that the Communist challenge must be taken most seriously.

It is interesting and revealing in this connection to study Mr. Khrushchev's recent tough and threatening remarks and relate them to Soviet actions. They have sought to capitalize on their recent missile achievements as a means of regaining some of the international prestige they lost when the rest of the world looked over the fence and saw what peace-loving communism did to the Hungarians and Poles.

At the same time, Mr. Khrushchev is saying airplanes are obsolete museum pieces, that the U. S. S. R. wants peace and supports peaceful methods, and that the United States has blocked disarmament efforts, Russia widely advertises her "intercontinental" ballistic missile, brags about her rockets, builds large numbers of modern combat aircraft, including intercontinental bombers, and then walks out of the United Nations disarmament talks.

All the while the Soviets are building and maintaining these huge forces, and in spite of the very considerable scientific progress they are making, her general economy remains far behind our own, as illustrated by the fact we produce twice the steel she produces, 14 times as many motor vehicles, more than 3 times as much electric power, and operate 3 times as much railroad mileage.

Perhaps the significant point here is that a nation with only a fraction of the industrial strength and resources of our own can, with its ruthless dictatorial system of government, make impressive progress along the lines in which they choose to concentrate their efforts. We can deplore the sacrifices their people are called on to make, but we must not fail to meet the competitive challenge. It will be costly and call for sacrifices on our part, in the form of personal effort on the part of some, and greater tax burdens than we like to bear on the part of all. If we are at times annoyed by the sacrifices we must make, we have grounds for hope that those under the Communist yoke will become outraged by theirs.

Our course seems very clear to me. We must do whatever it takes to meet this situation. We must recognize our community of interest with our free world friends and allies. We must, collectively with them, maintain adequate deterrent forces in instant readiness. We must plan our own programs for the long pull so that military security will not be undermined by economic insecurity. We must strengthen our foundations in the field of scientific and technical training and in basic research. And specifically we must broaden and deepen our programs for the exploration of outer space. We have the capacity to meet this challenge and still enjoy the highest standard of living that any people have ever enjoyed. My belief is that we would want to meet the challenge even if the standard of living had to suffer.

In closing, I would like to quote a few sentences from President Eisenhower's Oklahoma City speech which seem to me to epitomize our position:

"The goal we seek is peace with justice. This can come to our Nation only as it comes to all. The world's hope is that the Soviets will cooperate with all the rest of us in achieving this goal. Our defense effort, large as it is, goes only far enough to deter and defeat attack.

"We will never be an aggressor. We want adequate security. We want no more than adequacy. We will accept nothing less."

[From the NBC television program Youth Wants to Know]

YOUTH WANTS TO KNOW

Founded and produced by Theodore Granik

SUNDAY, NOVEMBER 10, 1957

YOUTH WANTS TO KNOW PRESENTS HON. DONALD QUARLES, DEPUTY SECRETARY OF DEFENSE; STEPHEN MCCORMICK, MODERATOR

The ANNOUNCER. Youth Wants to Know, the Peabody Award-winning program founded and produced by Theodore Granik. And here is your moderator, Stephen McCormick.

Mr. McCORMICK. Recent successes in rocket and missile development by the Soviet Union have resulted in serious criticism, both at home and abroad, of our scientific progress. Capitol Hill is starting a complete and thorough investigation of our program and President Eisenhower, in order to overcome Soviet supremacy in this field, has just appointed a czar to supervise and coordinate all phases of our scientific development.

Today our guest on Youth Wants To Know is one of the most important men in this entire program. He is Donald A. Quarles, Deputy Secretary of Defense.

Welcome to Youth Wants To Know, Secretary Quarles.

Secretary QUARLES. Steve, it is a great pleasure to be with you on this program.

Mr. McCORMICK. As you know, the young people appearing here today and under the auspices of the National Education Association have many questions for you.

Question. Mr. Secretary, how long do you think it will take us to catch up with the Russians in the satellite field?

Secretary QUARLES. Well, "catch up" is a difficult word because you have to define it more accurately. Of course, we will not have our scientific satellite up until probably March, although there will be some smaller ones put up earlier than that, and so March is perhaps the first date to mention there.

Question. Well, do you think as soon as we get our satellite up we will be up with them?

Do you think we will have more technology?

Secretary QUARLES. I would expect we will not, because I would expect they would do other things in the meantime along this general line.

Question. You say we won't get our satellite up until March. The scientists at the Redstone Arsenal said they could have put up a satellite 6 months ago. Why couldn't they have put it up then?

Secretary QUARLES. Their program involved the use of military rockets and involved some delay in military programs and we thought it was wise to make our satellite program purely a scientific program to serve the scientists and that is what has been done.

Question. Mr. Secretary, why is it that the sputnik was the only reason that the President and the Pentagon were awakened.

Why was this? Why did it take the sputnik to wake up the President and the Pentagon?

Secretary QUARLES. Of course, I won't agree with you about the waking up process because we were, I think, quite wide awake before that. It is true there was great popular interest in the Russian satellite and this has stimulated a lot of talk about this particular line of work.

Question. Well, Mr. Quarles, can you tell me, are we just ahead of the Russians—are we ahead of the Russians in some fields or are we behind in just this one field of the satellites? Are we ahead in some things, too?

Secretary QUARLES. Of course we are. In many fields of science and technology, there is no question about it. You only need to compare our life and the things that we enjoy with the things that they enjoy, generally. But in this particular field of earth satellites which they chose to emphasize, I think they are at the moment clearly ahead.

Question. Are we ahead of them in some other fields, in the scientific field?

Secretary QUARLES. Of course we are.

Question. What fields?

Secretary QUARLES. Well, a great many, but if you wish to limit it to the fields of military technology, which perhaps I should limit my discussion to, I should say that you would have to look hard to find fields in which they were definitely ahead of us, but I do agree that the earth satellite is one particular area.

Question. Exactly what fields are we ahead in? You said we are, but you failed to enumerate them.

Secretary QUARLES. I feel we are ahead in electronics. I feel we are ahead in atomic weaponry. I feel we are ahead in many branches of aviation, but I do not include the particular area of earth satellites which isn't incidentally a military area.

Question. Well, sir, in this morning's paper, Dr. von Braun said that these sputniks would lead to our outer space control and he said in 15 years this would be more or less like the control of the air, what it is today.

He was mentioning that was the one thing, but don't you think that could lead to our downfall, more or less, as the military control?

Secretary QUARLES. Well, I think outer space is going to be increasingly important and I think that we must undoubtedly move more energetically into this

area. However, I don't see in it the kind of threat to our security that you are interpreting, Dr. von Braun is implying.

Mr. McCORMICK. You disagree with the doctor, then, Mr. Quarles?

Secretary QUARLES. I don't remember and I don't know that Bill was quoting him exactly, but at any rate I would not say there is an indication that we will be in the danger that Bill has mentioned.

Question. Mr. Quarles, in the development of the intercontinental ballistics missiles and rockets, exactly where does the United States stand in relation to the Soviet Union?

Secretary QUARLES. Well, that is an area that you realize I can't quite respond to and say exactly because I would have to talk about things that I think we shouldn't talk about in exact terms, but I would put it generally that we have a program that is advancing very rapidly and very strongly. It is uncertain in my mind whether they will be ahead with actual operational capability in this very long-range ballistics missile field and in any event I would say that there will not be a great difference in the time of their operational capability and ours.

Question. Well, Mr. Secretary, are we or are we not ahead of the Soviet Union in this field?

Secretary QUARLES. In the field of intercontinental ballistics missiles?

Question. Yes.

Secretary QUARLES. I think it wouldn't be possible for anybody to answer that question exactly in terms that you ask it.

Question. Well, the Russian rocket which sent up Sputnik No. 2 is said to have 400,000 to 600,000 pounds of thrust and they say it can deliver a hydrogen warhead to the United States.

Do we have any rocket which is that powerful?

Secretary QUARLES. Henry, you say that it is said to have had that thrust and I would have to find out who said it and know a little more precisely about that. I don't think we have authoritative information to support that statement, and I would like you to remember that when you speak of a rocket it may involve many rocket engines, rather than just one rocket engine, so we have to be careful in the way we say that.

Question. Well, their rocket lifted 1,000 pounds up 1,000 miles, and it is capable by scientific figuring of carrying 5,000 pounds to the United States without getting out of the atmosphere.

Have we a rocket that is capable of lifting that weight?

Secretary QUARLES. We have rockets that are capable of doing the kind of thing you are describing, yes.

Question. Then why haven't we sent them up and started an artificial satellite before theirs?

Secretary QUARLES. As I have tried to explain, I think it was to Bill or Carl a little earlier, we didn't consider that an important part of a military program, and we just didn't schedule the doing of it and haven't done it. We have a scientific satellite program, only.

Question. Mr. Secretary, in what way will our satellite be superior to that of Russia?

Secretary QUARLES. Well, our first satellite I would say, will be somewhat superior to their first satellite because it will involve instrumentation that has been carefully prepared in cooperation with the scientists of the world, including scientists of Russia, to perform certain experiments and send back certain data on certain wavelengths. None of these things were provided by the first Russian satellite.

Question. Mr. Secretary, exactly who is responsible in the Government for this recent lag of the United States behind Russia?

Secretary QUARLES. The lag in the satellite field, if that is what you mean by the recent lag, I would say is the responsibility of all of us who planned this program for our scientific satellite in collaboration with the International Geophysical Year. I don't think you can say that any one person is responsible. It simply seemed the wisest course for the Government to follow.

Question. Why wasn't one sent up before this time? I still don't understand why, if we could have gotten one up before, why we didn't do it.

Secretary QUARLES. I think as we look back on it, we would all share your view that it would have been wise to put one up sooner, but don't overlook the fact that we are still exactly on the course we laid out for ourselves to put up the scientific satellite during the International Geophysical Year.

Question. Mr. Quarles, the United States has spent millions of dollars in presenting favorably the American way of life overseas, in Europe and in the Middle

East. Yet recently it has been virtually ignored—the political influence of the satellite.

Did the United States not lose a lot of prestige when the satellite went up?

Secretary QUARLES. I am not in a good position to tell you how much, if any, prestige they lost. I think undoubtedly there has been some influence. People from abroad that I have talked to about it have not implied to me that the influence was great.

Question. Secretary Quarles, it has been stated in the papers that the United States is at least 5 years behind in their ballistics-missile program. I would like to know, if we had a satellite which was launched first, do you think that this lag of 5 years would have had as much attention as it does now?

Secretary QUARLES. Well, again you speak, Ernest, of the papers saying a lag of 5 years. The only reference to 5 years that I myself know about from official sources was the fact that in a high-priority program we were perhaps 5 years later than they were in starting this kind of work, but that is not to say that we are 5 years behind them and, as I tried to say earlier, I think there is no such difference at all.

Question. Well, do you think that some of our allies will be turned toward Russia for any kind of support, economical or political support? Because of the Russian satellite?

Secretary QUARLES. I haven't heard of any of them who have shown any slightest indication of such a turning.

Question. We have heard so much about our country losing time by not starting right after the Second World War and working on these projects.

Why didn't they start the missile projects immediately, instead of waiting until the early 1950's?

Secretary QUARLES. We did start some ballistics missile work. We started many missile programs and we must be careful about words, because the word "guided missile" is quite broad and we might have three dozen different kinds of guided missiles. Most of us today are talking about long-range ballistics missiles that go up into outer space, so I think that is perhaps what you were talking about, and my answer to you there is that while we started a moderate line of development, we did not emphasize it for very technical reasons; it did not at that time have promise of being a very useful weapon, which it now has, I admit.

Question. Sir, what defense is there against the ICBM? It has been said that radar can't track it. Are you working on any defense right now and, if so, what is it?

Secretary QUARLES. Well, radar can track it and radar that can track it at great enough ranges to be useful is quite a possible thing, but it is also quite a large, expensive thing.

We are working on the development of radar and other devices that would be involved in a defense system, but everyone recognizes that the defense against a weapon of this kind would be a very difficult and expensive thing, even if we were sure it were practicable.

Question. What exactly are you working on?

Secretary QUARLES. In defense against ballistic missiles specifically.

Mr. McCORMICK. Without disclosing any secrets, Mr. Secretary.

Secretary QUARLES. That again is not an easy question to answer without going too far, but as I say, one has to work on improvements in radar, in the ranges at which you can detect and track objects of this kind traveling very high in space and then you have to work on missile systems that would be capable of intercepting such a weapon as it comes down. There is work along these lines going forward.

Question. Mr. Secretary, do you think something could be done about the interservice rivalry in ballistics development?

Secretary QUARLES. Well, I think first that the interservice rivalry has been greatly exaggerated in the public mind. We have tended to make this a scapegoat for the fact which people are uncomfortable about—that some other country has gotten out ahead of us in a spectacular thing like an earth satellite.

Actually there is a tremendous lot of talk in the papers about service rivalry and, to be sure, there are such rivalries, but I am not aware that they have actually delayed the programs we are talking about.

Question. Then why did the President have to appoint Mr. Killian in the event of rivalry?

Secretary QUARLES. I think the President made it very clear in appointing Dr. Killian that he wanted somebody—and we all feel that Dr. Killian is a very splendid person to get for this purpose—somebody to come down and watch this whole area of scientific research and development in relation to the Government

and defense, from the President's vantage point, and help him to take the right actions in relation to it.

Question. Mr. Secretary, I wonder if you could please tell us, sir, what exactly will Dr. Killian do? The President wasn't too specific in his powers. Will he be able to knock heads in the Pentagon and be able to get the services together?

Secretary QUARLES. Well, I don't think I can tell you what the President is going to do or just what he is going to have Dr. Killian do, because you realize that gets out of my area. However, I would assume that the President would use Dr. Killian to help him in this general area of scientific research and weapons work and help the President to cover that area of this enormously broad field that he is to cover.

Question. Then this appointment isn't just another Government appointment that we hear so much about, and that will be sort of looked over very soon. It will be an important one, then?

Secretary QUARLES. Well, I certainly think so. I don't think you could bring Dr. Killian full time down into the Government without its being important.

Question. Many of your scientists and technicians are going into industry because of low pay.

Are you considering raising their salaries to make staying in the service a more profitable career?

Secretary QUARLES. Well, I think there are some moves afoot in the Government and in Congress to increase the salaries of Government scientists, but I want you to realize that the great bulk of the scientists and engineers working in the field we have been talking about are actually the employees of industry, and not of Government.

Question. Are you considering raising the services' pay—the Army, the Navy, and the Air Force?

Secretary QUARLES. Yes, there are considerations of that kind, too, following up on what I think all of you will know as the Cordon (sic) report last summer.

Question. Mr. Secretary, with all our haste to catch up to Russia in the missiles department, why was the Army taken out of the long-range missile program after they developed the Redstone missile and the Jupiter missile?

Secretary QUARLES. The Army hasn't been taken out of the long-range missile program at all. They are still in the development work and all the development work they have ever been in, as a matter of fact.

It is true that in assignment of the mission in the armed services to use these missiles in combat, the Secretary of Defense decided that missiles of the range we are talking about—that is, beyond 1,000 miles, let us say, in range—should be the role and mission of the Air Force rather than the Army, because it involves their kind of business, so to speak.

Question. Well, why were they put right back in? According to Dr. von Braun they were taken out and later put back into the program, after which they developed the Jupiter-C missile.

Secretary QUARLES. That again, Carl, isn't quite what he said. They weren't given the assignment of putting up a satellite with the Jupiter-C rocket which they originally proposed and that was because, as I said earlier, it involved military rocketry and at that time it was felt it would involve delays in military programs. They have been put back into the satellite program in recent days.

Question. Well, Secretary Quarles, it is quite apparent that there is some rivalry between the services, and 7 years ago Dr. Killian urged there be greater coordination of the development of rockets. Why wasn't something done sooner?

Secretary QUARLES. Well, let me answer the first part of your question first. It is perfectly true that there is rivalry between the services and we have—I think you will all agree—accepted in our way of life the value of rivalry and competition, to a degree.

Now the question isn't whether there is rivalry. The question is whether it has had harmful results. As for the carrying out of Dr. Killian's recommendation some time back, I think it is a fact that there has been the kind of coordination you assume there has not been.

Question. What steps will you take in recruiting scientists?

Secretary QUARLES. Well, perhaps you mean here, into the Government service, and I again want to make it clear that this missile work that we are talking about is very largely carried out in industry and of course they have taken, as all of you know, very energetic steps to recruit scientists into these programs. And I think, generally speaking, they have been successful.

As for scientists into the Government, again I think that we are at some disadvantage because the pay scales in Government aren't quite comparable

with those in industry but nevertheless there has been quite good success, particularly in these programs that people are excited about.

Question. Mr. Secretary, do you think it would be possible to put all the missile development under one roof?

Secretary QUARLES. Under one roof?

Question. Yes, sir.

Secretary QUARLES. I know you use that word figuratively, but of course just the fact that you use it illustrates why it isn't possible. The missile work involves actually billions of dollars and that means thousands upon thousands of people working in it, and from many different branches of industry across the whole country. And when you consider the scope of the thing, you realize that while it all should be directed and coordinated, it wouldn't be possible to put it under one roof, either figuratively or literally.

Question. What about these unidentified flying objects that have been sighted all over the United States? Is this a project of our Government?

Secretary QUARLES. There have been unidentified flying objects sighted for many years and it has been one of the functions of the Department of Defense—actually the Air Force—to investigate these and they have investigated all that they have had reliable reports on and the great bulk of them have been found to have been either manmade objects that are quite explainable, or natural phenomena that usually deal with atmospheric electricity in one form or another.

Mr. McCormick. Mr. Secretary, a young lady here has seen one of these flying objects. Is that right, Sylvia?

Question. Yes.

Mr. McCormick. Where was this?

Question. Over near my house, my farm.

Secretary QUARLES. Where is that?

Question. Primrose Acres, in Annapolis.

Secretary QUARLES. Annapolis, Md.?

Question. Yes.

Secretary QUARLES. What sort of thing did you see?

Question. It appeared to me to be a flying saucer.

Mr. McCormick. Would you draw us a picture of that to give us some idea of how it looked and you might give us a description of what it looked like.

Was this at night when you saw this, Sylvia?

Question. Yes. It was sort of shaped like that [indicating].

Mr. McCormick. Like a saucer?

Question. Yes, sir; and it was laying on its side and it had a stripe like down here, and there was more of a darker shade. And then it had sort of a coral bottom. The color was bluish-white. This part right here was more of a darker bluish-white and this was lighter.

Mr. McCormick. How far off the earth was it, Sylvia?

Question. I would say 75 or 100 feet off the earth.

Mr. McCormick. Did others see this with you?

Question. Yes, sir; my girl friend, Jean Hunt. She is here today and she saw it, too.

Mr. McCormick. Mr. Secretary, we have heard all sorts of stories of this kind going on.

Isn't it difficult to disprove these things?

Secretary QUARLES. I don't think we disprove them at all. I am sure Sylvia's observations were perfectly reliable and I don't, of course know exactly what she saw. I can only say that, oh, in something between 90 and 95 percent of the cases where there has been enough information to investigate them, it has been possible to explain them quite completely and in the other cases we believe that we simply didn't have enough information about it. And to put it the other way around, we have never had any evidence that they were of extraterrestrial origin, as most people like to imagine they are.

Question. Well, sir, is the Air Force really afraid or is the Department of Defense really afraid to admit that there is a possibility that they might be something from outer space? Is it something you are holding back?

Secretary QUARLES. No, I can assure you there is nothing whatever held back. We have no fear on the subject whatever. There has never been the slightest evidence that there are objects of this kind that should cause us any fear.

Question. Then it is nothing that our Air Force or our Government has been experimenting with?

Secretary QUARLES. The things that have been observed have sometimes been experimental objects that people didn't recognize, but our Air Force, or our

Government is not experimenting with flying saucers of the kind Sylvia felt—Sylvia saw.

Question. Well, Mr. Secretary, the Air Force has always emphasized that maybe 95 percent of the objects sighted were explainable by ordinary means, but there is always that remaining percent that are never explained, and I wonder if you could give us any logical explanation. I have never heard one.

Secretary QUARLES. Well, I can only say that where you have hundreds of these things, it isn't at all surprising to me that a few of them are not described sufficiently or not enough is known about them to be able to give an explanation of them. I think that if they had any very special character you would have found that in the 95 percent that you could identify carefully.

Question. But in many cases such as one case where a pilot and his aircraft disintegrated several years ago, adequate facts were on hand, yet they still were not explained. Authorities disapproved the Air Force explanations.

Mr. McCORMICK. Dave, that is an interesting question and, Mr. Secretary, I would like to get a long answer to it but I find our time is up.

Thank you very much, Donald Quarles, Deputy Secretary of Defense, for being our guest today on Youth Wants to Know.

Now before closing may I remind you this is American Education Week and here is a brief message from the President of the United States.

President EISENHOWER. The strength of our arms is always related to the strength of our minds. Our schools are strong points in our national defense. Our schools are more important than our Nike batteries, more necessary than our radar warning nets, and more powerful even than the energy of the atom. This is true if for no other reason than that modern weapons must be manned by highly educated personnel if they are to be effective and the energy of the atom can only be understood and developed by the most highly trained minds in the country.

The ANNOUNCER. The questions you have just heard do not necessarily reflect the opinions of Youth Wants to Know, the National Broadcasting Co., or the National Education Association.

Join us again next week when Youth Wants to Know will present a special program on juvenile delinquency. Our guest will be Judge Samuel Leibowitz, an outstanding authority in this field.

QUARLES NOT HAPPY WITH MISSILE DEVELOPMENT

Senator JOHNSON. Mr. Quarles, I know you have been mindful all evening of the importance of giving to the committee the fullest and most detailed testimony and the most accurate data and candid opinions that you possess.

There are many good reasons, I think, why this should be done. There is one, however, in addition to the primary reason that our very survival could depend on it, and I would like to mention it, and that is this:

History will review what you have said here today and what you will tell us in executive session. The record of that testimony will be tested by the actual developments which the future will bring.

Now, with that in mind, Mr. Quarles, having great respect for not only your capacity but your sincerity and your devotion to the national interest as you see it, I should like to ask you this question:

As you appear before us tonight and speak to this committee and the American public, are you happy with the development of our missile program?

Mr. QUARLES. No, I am not happy with it, Mr. Chairman.

Senator JOHNSON. Is it your judgment that the certainty of success is more important than speed in scheduling production of specific missiles?

Mr. QUARLES. No, it is not my judgment that certainty of success—

Senator JOHNSON. Is it your opinion, in retrospect, that perhaps we have been too cautious too long in certain respects?

Mr. QUARLES. In respect to the long-range ballistic-missile program, Mr. Chairman, it is not my judgment that we have been too cautious; but I do not apply that across the board.

Senator JOHNSON. Would that, then, by implication, mean we have been too cautious too long in the other missile programs?

Mr. QUARLES. In the other development programs, whether missile or aircraft or other things, in some of them.

Senator JOHNSON. How much has our missile program been controlled by the policy decisions of the National Security Council?

Mr. QUARLES. Well, I think in a very broad sense, all of our programs are controlled by the Commander in Chief, and of course he gets his advice from the Security Council, so, Mr. Chairman, in that broadest sense, I think you would say they are all controlled by them.

I am not sure whether that is responsive to your question or not, though.

Senator JOHNSON. Well, let us take the Budget Bureau. How much has our missile program been controlled by the policy decisions of the Budget Bureau, in your opinion? And I would like you to speak frankly and candidly.

Mr. QUARLES. Yes.

Senator JOHNSON. Because you know what I am talking about. You know the feeling abroad in the land. You know the concern that the people feel. You know the unrest that exists right here at this committee table. And you, better than anyone I know, have had your fingers right on top of this thing, and you are the most experienced man in that Department in policymaking decisions. So if you would just let down your hair and speak fully and frankly to us, I think you could perform a great service.

Mr. QUARLES. Again, Mr. Chairman, in respect to the top priority ballistic missile program, as I think you are primarily interested in, I would say that the Budget Bureau has joined in this, I will say the spirit of this great urgency.

I should have mentioned that they have a member sitting on the ballistic missile committee operating under Mr. Holaday in his present capacity, and that member deals with Budget Bureau matters at the same time the other officials that I speak of deal with their situations.

So I think that one has to say that both in respect to the Budget Bureau and all other respects, the handling of the funding of these programs has been not only satisfactory, but has produced the greatest progress that technical limitations would permit us to produce.

Senator JOHNSON. Are you aware of any decisions in the National Security Council or in the Budget Bureau that have retarded or slowed down our development in the missile program?

Mr. QUARLES. Not in these high priority ballistic missile programs that I speak of.

There have been missile programs, certainly, that have been slowed down by fiscal considerations, and some have been canceled because of the fact that their cost was judged to be out of proportion to their values.

I do not think this was Budget Bureau, though, Mr. Chairman, in a literal sense.

Senator JOHNSON. How much is our missile program controlled by the policy decisions of the Treasury Department.

Mr. QUARLES. Well, I am not aware that they have entered into the missile programs, Mr. Chairman.

SATELLITE PROGRAM NOT SLOWED FOR LACK OF FUNDS

Senator JOHNSON. Has lack of funds had anything to do with retarding the action taken in connection with the launching of our satellite?

Mr. QUARLES. The satellite program, I think, throughout has received the funds that it requested.

There have at times been delays in granting the fund, but I believe the delays have never carried to the point where the program slowed down or stopped for lack of funds.

This is my best information.

Senator JOHNSON. Are you of the opinion that the American people are as aroused as this committee and as you are about the situation which faces us?

Mr. QUARLES. Mr. Chairman, you are in so much better position to judge that than I am. I am sure they were not so 3 months ago. Whether they are today, I really can't judge. I believe the American people, you would have to say, are not as aroused about this as we here are.

Senator JOHNSON. Well, I have my judgment on it, and I know of few things without even excepting Pearl Harbor which in my judgment have so alarmed them and so concerned them. I think we have cause for concern, but not for panic.

Mr. QUARLES. Yes, sir.

Senator JOHNSON. And I think that with the resources of this Nation if they are fully utilized and if we all close ranks and get on with the job, we will be equal to the challenge.

I appreciate the effort, capacity, devotion, and dedication that you feel, and I am grateful to you for having answered with dignity and with feeling the rather searching questions that the counsel has asked you.

Senator CASE, do you have any questions?

Senator CASE. Mr. Chairman, just a few.

Mr. Secretary, with reference to the Cordiner report and if I understood correctly, you said that there was some talk last session was not a good time for its pressing.

Would you elaborate on that a little bit to indicate what you meant?

Mr. QUARLES. Well, in the first place, Senator CASE, the matter came up—

Senator JOHNSON. I want to raise a point here. I think I ought to put it in the record. I am very anxious to see that every Senator goes into any line of inquiry he desires to pursue. I have had called to my attention by the chairman of the full committee that there is a special committee that has exclusive jurisdiction of the Cordiner report and presently has that report under consideration. That committee is headed by the distinguished Senator from Mississippi, Mr. Stennis.

Now, having pointed that out and having made it abundantly clear in the record, I think it then quite proper that the Senator from South Dakota and the Deputy Secretary exchange their viewpoints on it. I would not want the public or the chairman or the sub-

committee chairman to feel that I felt we had any legitimate jurisdiction, in view of the existence of that subcommittee. We expect to cooperate with that committee fully, as I know the Senator from South Dakota does.

Senator CASE. Yes, Mr. Chairman. The only reason I asked is because the testimony has already been offered on it here tonight, and some statement was made as to why it was not pressed at the last session. I think the phrase was "it was not considered a good time."

Mr. QUARLES. I would have to here express my own opinion, because I do not think I am in a position to say more than that. But my own opinion is that, coming up at the time that it did in the last session and in the general atmosphere in the last session with great emphasis on economy, as the Senator will remember, it was my opinion that it was not sufficiently worked out and that the time was not propitious for the administration to press it.

Senator CASE. Mr. Secretary, in your speech to the mayors, you pointed out something about that situation when you said:

First, a word about fiscal matters. The appropriations for national security have, I feel, been disappointing. The appropriations for defense account were some \$2.5 billion below the President's original budget request. The appropriations for military assistance and defense support to our allies, not including economic assistance, were some half billion less than requested, and not all of these were unilateral congressional cutbacks. Some of the cuts were accepted by the administration as the whole picture unfolded. Perhaps the most disturbing aspect of the whole matter, from my standpoint, is the change in climate from last year, when \$900 million extra was added by Congress to the defense budget to meet what Congress believed to be the national-security problem, and this year, when \$2.5 billion was cut from the budget. Fundamentally, this change in climate reflects a change in public estimates of our security position and, in my judgment, is not justified by the facts.

Was that part of the feeling at the time to which you refer?

Mr. QUARLES. That is correct, Senator Case. That speech was made pre-sputnik, and, as we have discussed here, I think that the climate of public opinion has changed very substantially since that time.

HE TRIED TO STIR UP PUBLIC INTEREST IN SUPPORT OF DEFENSE PROGRAM

Senator CASE. And what was your purpose in putting this in your speech at that time—to help change the climate?

Mr. QUARLES. My purpose in putting it in, my sole purpose in putting it in, was to try to stir up a public interest in the full support of what I considered to be a necessary defense program, and, in the climate at that time, I felt it was very necessary to bring this to the attention of the public.

Senator CASE. In your speech to the Wings Club on the 18th of November you said:

Russia alone has more than 170 divisions. Her western satellites have another 70, and the Communist Far East around 200, a grand total of around 440 divisions. When we add to this the Communist-bloc combat air strength of more than 25,000, including the most advanced types, and her 500 submarines, the largest submarine fleet in the world, we see a very formidable and immediate capability.

What was your purpose in saying that to the Wings Club?

Mr. QUARLES. My purpose, Senator Case, again was to stress the great power of the Communists, the great military power of the Communists, and the great need for this Nation to recognize that, and

recognize the rate at which it was building up, and to dedicate itself to a solid defense against it.

Senator CASE. You were attempting to arouse the country to the challenge before us?

Mr. QUARLES. I was, sir.

Senator CASE. In that same speech, you said:

It will be costly and call for sacrifices on our part in the form of personal effort on the part of some and greater tax burdens than we like to bear on the part of all. Our course seems very clear to me. We must do whatever it takes to meet this situation. We must recognize our community of interest with our free-world friends and allies. We must, collectively with them, maintain adequate deterrent forces in this. We must plan our own programs for the long pull so that military security will not be undermined by economic security. We must strengthen ourselves in the field of technical training and in basic research and, specifically, we must broaden and deepen our programs for the exploration of outer space. We have a capacity to meet this challenge and still enjoy a higher standard of living than any people have ever enjoyed. My belief is that we would want to meet the challenge even if the standard of living had to suffer.

Was that also for the purpose of arousing the people?

Mr. QUARLES. That was the purpose, sir, and my sincere effort; to state the challenge and state it in as provocative a way as I could so that the American people, who will always arise to a challenge when they see it, would rise to this one.

Senator CASE. At another point in the same speech before the Wings Club, you said:

Our concern is with the speed and scope of the Soviet progress. We must be aware of the challenge this holds for us in the future period. We, too, must push ahead on a broad front with due regard to scientific foundations for the long-range effort. As the President brought out so well in his Oklahoma City speech last week, this calls for a new look at our educational system along with increased emphasis on basic research.

Did you have the opportunity to hear or read what Dr. Teller and other witnesses before this committee have said on that matter of basic research and taking the new look at our educational system?

Mr. QUARLES. I read quite a complete newspaper account of what he said. I have not read the complete transcript, but I believe I am quite familiar with what he said, Senator CASE.

REVAMPING OF EDUCATION SYSTEM AS URGENTLY NEEDED

Senator CASE. And in your speech on November 18 to the Wings Club, you were attempting to alert the country and arouse them to the need of revamping our educational system, perhaps with more emphasis upon basic research?

Mr. QUARLES. I was doing it then and I have done it many times, and I believe sincerely, as Dr. Teller so ably brought out, that this is a very important thing to get across to the country.

Senator CASE. And you generally then endorse that idea?

Mr. QUARLES. I endorse that idea, and moreover, I endorse substantially all of Dr. Teller's recommendations.

Senator CASE. Thank you. That is all, Mr. Chairman.

Senator JOHNSON. Senator Kefauver.

Senator KEFAUVER. Thank you, Mr. Chairman and Mr. Quarles. I had a speaking engagement where my little boy was going to be present tonight, and I couldn't cancel it after this meeting was set, so I did not get to hear all of your testimony. If I ask you any

questions that you have responded to in response to questions by the counsel, you say so and I will not pursue them any further.

Mr. Quarles, did you read the article by Dr. C. C. Furnas in the October 21 issue of Life magazine?

Mr. Quarles. I did, Senator Kefauver, yes, sir.

Senator KEFAUVER. Do you agree with the facts that he states in here or with his conclusions, or do you recall all of them?

Mr. Quarles. I do not recall every one of them. I certainly agree with them in the main. I believe as I read it that there were one or two statements of fact that I was inclined to feel were not quite in accord with the record, but I would say this was minor, Senator Kefauver.

Senator KEFAUVER. Dr. Furnas was the Assistant Secretary of Defense for Research and Development from December 1955 until February of 1957, he states here.

Mr. Quarles. That is factual, I think, sir.

Senator KEFAUVER. He says in the last paragraph:

In the case of the space satellite we had the money and talent and facilities to do the job—but only in pieces, with the pieces trapped within the high fences surrounding the individual services. Unless we can devise without delay some means of putting the pieces together and keeping them together on a permanently functioning basis, I am afraid that we will soon find ourselves gaping at still further Russian triumphs.

Do you subscribe generally to that?

Mr. Quarles. Yes, sir, I subscribe generally to it and particularly to it in relation of this exploration of space field and, in fact, that is precisely the reason the Secretary of Defense has, as he announced this afternoon, decided upon a unified defense program in this area.

Senator KEFAUVER. You do feel that in the past the reason we have gotten behind and we have not made the success that we needed was that the pieces were trapped within the high fences surrounding the services, and that we were not putting the pieces together? Is that about your conclusion?

Mr. Quarles. I would have to disagree somewhat with that wording, because I am not aware of high fences around the services existing or having any such effect as might be implied here. I think that the language is colorful, but this is one of the examples where I said I think I would have had to say it a little differently.

Senator KEFAUVER. He says in the first part that the United States—I am quoting:

The United States should have been and could have been the first nation to launch a satellite. Some officials who now belittle Russia's sputnik are among those who, in the first place, were not convinced our own satellite program was worth pushing. Had they been so convinced, there is every reason to believe that a United States satellite could have been orbiting the earth as early as 1955. Instead, it was not until 1955 that a United States satellite program was even seriously discussed.

Is that true that it was not seriously discussed until 1955?

Mr. Quarles. I remember the first serious discussions as being early in calendar 1955. I think I am correct about that date.

NO INTELLIGENCE AS TO SOVIET INTEREST

Senator KEFAUVER. Was there not information from the Intelligence Service that the Soviets were going along with the satellite at least 2 years before that time?

Mr. QUARLES. To the best of my belief, there was no intelligence information at that time that the Soviets were moving into a satellite program.

There had been, let me say, speculations by scientists of many nations about the possibility of erecting satellites and the characteristics they would have, and I do not refer to such speculations because in our own country they go back many years, but I do refer to the existence of programs for the research and development and launching of satellites. And I believe it is a fact that we had no intelligence information at that time that the Soviets were doing so.

Senator KEFAUVER. He further says, in talking about the lack of interest:

Despite this lack of support, by the spring of 1955 enough high-level interest had been generated to spur Donald Quarles, then Assistant Secretary of Defense for Research and Development, to appoint a nine-man, all civilian Scientific Advisory Committee, and that he was a member of this Committee and had met several times in the spring and summer of 1955.

That was the committee that you appointed?

Mr. QUARLES. That was the so-called Stewart Committee; yes, sir.

Senator KEFAUVER. And he says here that one of the first jobs that the Stewart Committee had, or this committee, was to settle the dispute as to who should make the rocket for the launching of the satellite for the IGY, in time for IGY, the Army or the Navy, and that this was discussed some time. And the Redstone, the Army people thought they were further along in development. The Navy said it was further along in instrumentation, but its Viking missile would need a redesigned motor.

When was this matter presented to the Stewart Committee, the so-called Stewart Committee?

Mr. QUARLES. It was early in 1955, Senator Kefauver. I would have to give you the date for the record. I do not know exactly.

Senator KEFAUVER. How long was it considered in 1955 before a decision was made?

Mr. QUARLES. The whole consideration was several months, but again I will have to supply the exact answer for the record. (The Department of Defense furnished the requested information as follows:)

The Stewart Committee was given the satellite problem in July 1955. A report was made by the Committee on August 1, 1955, and the satellite program was given to the Navy in September 1955.

Senator KEFAUVER. He says here that the Committee considered the matter and, apparently, not very much was being done, either by the Navy or the Army, with their missile for the launching of the satellite during the time of consideration, and that, finally, he says, to make matters worse, they lost you as Chairman, that you became Under Secretary of Defense, and that they had a split recommendation which was handed to you, and that on this split recommendation you made the decision to give this work to the Navy and not to the Army at its Redstone Arsenal. Is that correct?

Mr. QUARLES. Yes, sir. I would like to be a little more precise about it. This Committee did make a 7-to-2 recommendation for what we now know as the Vanguard program. In view of the split, I asked our Research and Development Policy Council to review the Committee report, and the Policy Council, which consisted of the

top research and development people in all three of the services, both civilian and military, recommended that the project, that the Navy Vanguard project, as we now know it, be approved.

Again, this recommendation had a dissent from the Army members, but Defense and Air Force and Navy were in favor of that position, and, as a result, as Assistant Secretary of Defense, I recommended that position to the Secretary of Defense.

Senator KEFAUVER. Dr. Furnas says that 4 committee members felt that they should give it to the Navy; that he and another member cast a dissenting vote; and the 3 remaining members, he says, were not missile experts and decided to go along with the majority.

Anyway, when did you make the decision, Mr. Quarles, to give the missile to the Navy rather than to the Army?

Mr. QUARLES. I will have to supply that for the record, Senator Kefauver.

The Department of Defense advised that the satellite program was given to the Navy in September 1955.

Mr. QUARLES. It was right at the time that the Committee made its report and that we had the Policy Council review it. It really should not be called a decision because, of course, as Assistant Secretary, I was recommending it; but my recommendation was accepted.

Senator KEFAUVER. As I get it from this, the Committee was appointed in March 1955, and you moved up in 1955 to become Secretary of the Air Force, and then Dr. Furnas became the Chairman in 1955, in December of that year, and a decision had not been made by that time, apparently, so it must have been made after December 1955.

Mr. QUARLES. I think that is not correct, Senator Kefauver. I think the facts are that I made the recommendation before I left the Defense Department, which was in August of 1955, and the project was, in fact, accepted; my recommendation was accepted before that time.

THEY WOULD COME TO DIFFERENT DECISION TODAY

Senator KEFAUVER. You feel, Mr. Quarles, in light of the Navy's failure to develop the Viking and get a missile up by this time, that that was a wise decision?

Mr. QUARLES. As well as I can judge today, the finding that the Navy had the best chance to do it with the technology they proposed would not be the finding of the same technical committee if it reviewed the matter again today.

Senator KEFAUVER. You mean if you reviewed it again today they would have decided in favor of the Redstone?

Mr. QUARLES. I think they would have, and I, of course, would have agreed, would have concurred in their recommendation. Of course, this admits that much new information has been added to what was available to them at that time.

Senator KEFAUVER. Were not the Redstone people claiming that, within 6 or 7 weeks, if given sufficient emphasis even back in the early part of 1955, they could have a satellite in orbit?

Mr. QUARLES. No, sir. I think they were not. I think the orbiter program, which was the Redstone program at that time, was proposed, and this was in, let us say, March or April of 1955. The earliest

date that they were willing to talk about was 18 months to 2 years after that.

Senator KEFAUVER. Eighteen months would have been the early part of 1957.

Mr. QUARLES. It would; yes, sir. And the Navy talked about the same time.

Senator KEFAUVER. The Navy has not done so well. They have had a lot of bad mishaps.

Mr. QUARLES. I would not like to agree that they have not done so well. I think what happened there was that the Navy, under pressure of the scientific community who were trying to get more and more instrumentation in the satellites, undertook a bit more than the technology immediately available justified, and, as a result, they have had delays in their program.

Senator KEFAUVER. Mr. Quarles, when you decided that the Redstone Arsenal was not going to go on with its Jupiter, they substantially stopped work on it at that time, did they not?

Mr. QUARLES. Well, I think it would appear from the present record that some things continued to happen, Senator Kefauver.

Senator KEFAUVER. I know, but I mean very little was done from the latter part of 1955 until just here recently when it was reactivated.

ARMY FAILED TO GET PRIORITY FOR SATELLITE

Mr. QUARLES. Well, no, sir. What I meant to imply was this; that they did have continuing rocket programs, and, for technical reasons that would take some time to explain, they found that continued work on what we now call Jupiter-C system was a convenient thing to do in their other programs. So, actually, they have advanced the Jupiter-C program right up to the present time.

Senator KEFAUVER. But they were not given the priority to go ahead with their Jupiter program and to push it for the purpose of getting a satellite launched?

Mr. QUARLES. No; they were not, sir.

Senator KEFAUVER. But now the program has been revived and their schedule is January or sometime like that?

Mr. QUARLES. They have talked about the possibility of getting one up. I think February is the earliest date they now expect.

Senator KEFAUVER. And Mr. Wilson limited the Army to a 200-mile missile, in that category?

Mr. QUARLES. Not precisely; no, sir. The Army was authorized the development of a missile of 200-mile range as part of the Redstone missile program, but the Army was also authorized the development of a 1,500-mile Jupiter missile, and it has been on that top priority since that authorization, which took place in the late fall of 1955.

Senator KEFAUVER. Do you believe, Mr. Quarles, that, as you now say, if you had the facts, a different decision would have been reached; that it was this decision that resulted in the Russians launching their satellite before we did? If the decision had been otherwise, we would have had one up 8 months before they did?

Mr. QUARLES. I think that, if the decision had been the other way, they might very possibly, the Army might very possibly, have launched one first. I must say, however, that the Navy proposed, itself, the same program of launching as the Army, and we were talking about

speculation when we say that one would have done it when the other did not.

Senator KEFAUVER. Mr. Quarles, you have had the money, and I always wondered why you did not let both programs go on. Both of them thought they had good programs. Why did you not let both programs? You had enough money to do it. Why did you have to decide between them?

Mr. QUARLES. Well, Senator Kefauver, when you say we had enough money, I think back to the very difficult atmosphere at that time of getting anybody to be interested enough in the project to put any money in it whatever.

Senator KEFAUVER. Tell us more about that. Who was not interested, Mr. Quarles?

Mr. QUARLES. I would say that it started with the public and went pretty much across the board at that time.

The Navy's estimate of the cost of the program was \$10 million.

After looking around, we came to the conclusion that they had been unduly conservative and doubled the amount.

The program is now costing \$110 million. This illustrates the difficulty at that stage in telling just what costs are going to be. And at that time, even the \$20 million cost which was estimated was a cost of which many people wondered about the justification.

Senator KEFAUVER. It says here that you told the committee that there was \$20 million available in the Department's emergency research and development fund, and the conclusion is that there was enough money for both the programs to go ahead.

Mr. QUARLES. There was \$20 million available, made available from the research and development fund.

As I have attempted to bring out, though, Senator Kefauver, this proved to be grossly inadequate, even for one program.

Senator KEFAUVER. You said that there just was not enough interest, Mr. Quarles. But I suppose we all did not know enough about it and were all complacent.

Senator Byrd read the record here that Congress had appropriated everything you asked for for satellites and missiles.

Where was the principal lack of interest? I do not think you can say it was in the Congress, because we appropriated all the money that you suggested or asked for.

Mr. QUARLES. I think that Senator Byrd was speaking about appropriations in a much larger sense than this particular project.

This particular project did not come up for appropriation until the fiscal year 1956, fiscal year 1956 budget was presented.

At that time, there was only a very modest amount of appropriation for this program. I do not remember what it was but it was small, and pretty much escaped notice, I think, in the Congress at that time.

Senator KEFAUVER. Mr. Chairman, I would like, since I have referred to parts of this article, that it be printed in the record.

Senator JOHNSON. Without objection, that will be done.

(The article referred to is as follows:)

WHY DID THE UNITED STATES LOSE THE RACE?—CRITICS SPEAK UP

Text by Dr. C. C. Furnas

Dr. C. C. Furnas, a chemical engineer and expert on guided missiles, served as Assistant Secretary of Defense for Research and Development from December 1955 until February 1957. In that position and as a member of many scientific advisory committees, he has observed the progress of the United States satellite program at all levels. Now returned to his post as chancellor of the University of Buffalo, Dr. Furnas last week gave Life this exclusive and critical report on why the United States satellite has not yet been launched.

The United States should have been and could have been the first nation to launch a satellite. Some officials who now belittle Russia's sputnik are among those who, in the first place, were not convinced our own satellite program was worth pushing. Had they been so convinced, there is every reason to believe that a United States satellite could have been orbiting the earth as early as 1955. Instead, it was not until 1955 that a United States satellite program was even seriously discussed. But, with vigor and determination, even at that late date we might still have got our moon up there first. We had the brains, we had the know-how, we had the money. Why, then, did we not get the first satellite?

All too frequently it has been the view of our Defense Establishment that research not directly related to the development of military hardware is entitled to only secondary consideration. It has been regarded as a sort of extracurricular scientific pastime to be indulged in only if money is left over from the really important things.

This is a tragically naive and shortsighted outlook. Every scientist knows that a single fruitful concept can render an entire weapons program obsolete and open up a host of new possibilities to explore. Out of the basic experiments on aerodynamic forces by the Wright brothers and Langley came the age of aircraft and missiles. Out of Hans Bethe's abstruse calculations on the nature of the sun's energy came the hydrogen bomb. In the case of the satellite, it was the then Defense Secretary Charles Wilson's contention (and still is, judging from his latest public pronouncements) that, while a satellite is a nice scientific trick, it has no real military value. Therefore, why spend military money on it?

It was not that our Defense Department lacked the money. It lacked only the interest. The Pentagon seemed unable to see the obvious military advantages of a satellite, even though some scientists and officers in the military forces were most vocal in pointing them out more than a decade ago.

In 1954, after plans got underway for the International Geophysical Year, an urgent interest in an American satellite was expressed by the National Academy of Sciences, sponsoring agency for the United States IGY program. But the Academy had no money. It turned for help to the National Science Foundation, the agency created by Congress to encourage basic research. But the Foundation's funds were puny compared to the magnitude of the task, and Congress showed no disposition to appropriate more. Despite this lack of support, by the spring of 1955 enough high-level interest had been generated to spur Donald Quarles, then Assistant Secretary of Defense for Research and Development, to appoint a nine-man, all-civilian Scientific Advisory Committee. I was a member of this Committee, which met several times during the spring and summer of 1955.

First, we were asked to decide on the feasibility of launching a satellite in time for IGY (mid-1957 to the end of 1958). We were well aware of many thorny problems which had to be solved. Nevertheless, we agreed that there was a reasonable hope of doing this if the personnel, facilities, and funds were granted on a high-priority basis. Next, Mr. Quarles told us there was \$20 million available in the Defense Department's emergency research-and-development fund. Would that be sufficient to do the job? Our answer was a unanimous, resounding "No." We all agreed that several times that amount would be required for the project.

Finally, we were asked to select 1 of 3 service satellite proposals: (1) The Army believed that its giant Redstone missile could be perfected as a launching vehicle within a year and that its scientists could develop the satellite and instruments in time for IGY. (2) The Navy was much farther ahead in instrumentation, but its Viking missile would need a redesigned motor with added thrust in order to lift the satellite high enough and fast enough. (3) The Air Force offered the mighty Atlas missile, but it was cautious about promising any definite delivery date.

The Committee toyed with plans for combining the best features of all three proposals—for example, trying to use the Army's farthest advanced missile to launch the Navy's farthest advanced satellite instruments. But putting together parts of the separate systems involved certain difficulties, technical and administrative. I recalled, for example, sitting in on earlier meetings as Chairman of the Guided Missiles Committee of the Research and Development Board. We tried

to persuade the Navy and Air Force to combine their skills in producing a single 500-mile range, subsonic, surface-to-surface missile. Each service thought a single missile was a fine idea. But if there was to be but one missile the Navy thought it should be the Navy's and the Air Force thought it should be the Air Force's. As a consequence, we have two such missiles—the Air Force's Matador and the Navy's Regulus.

All of us had had similar experiences with the military services. We were familiar with the rivalries and jealousies that would cause delay and frustration. We knew of the unwillingness of one branch of service to contribute personnel, money—or even information, at times—to a project for which some other branch would get the most credit. We all felt that a joint-effort satellite would take a long time to get off the ground, much less reach outer space. We finally decided that breaking the space barrier would be an easier task than breaking the inter-service barrier. If the job was to get done in a hurry, it had to go to a single branch of service.

Once this was decided, the assignment was a tossup between the Army and the Navy plans. Four Committee members felt it would be wisest to take advantage of the Navy's lead in satellite instrumentation and trust that the needed power could be built into the Navy missile in time for IGY. But one other member and myself cast dissenting votes. We felt that the Army's advanced rocketry would make possible an earlier satellite launching. The remaining three members said that, since they were not missile experts, they would go along with the majority. Quarles was handed this split recommendation. After a careful study, he assigned the job to the Navy, and it became known as Project Vanguard. Quarles' decision was purely technical. No politics were involved.

From the beginning we were stymied by the chronic monetary constipation of the Armed Forces wherever expenditures which they consider nonmilitary are concerned. Money was squeezed from odd corners of the various military budgets, and we got all the help which the National Science Foundation could give us. But the funds were dribbled out in such a manner that work was often slowed up for weeks and months at a time.

Then a new blow fell. In the original budget discussions, we had understood that, whenever we used the facilities of the Army, Navy, or Air Force, they would absorb the housekeeping expenses. But, meanwhile, there had been a drastic revision of the military accounting system. As a result, when we used, say, Patrick Air Force Base in Florida for a missile test, we had to pay rent for use of the missile range and also pay the cost of all the personnel and equipment we needed. These enormous, unexpected expenses raised havoc with our already tight budget.

To make matters worse, the program lost the leadership of Quarles, who moved up in August 1955 to become Secretary of the Air Force. For several months there was only an Acting Assistant Secretary for Research and Development in Quarles' place. Then in December I took over the job. Sitting in his seat, I got an even better insight into the difficulties of reconciling the numerous inter-service rivalries. It was during this period, for example, that the well-publicized row occurred over whether the Nike or Talos should be our standard antiaircraft missile. The Army pushed the Nike, but the Air Force insisted on using the Talos to defend its SAC bases. The matter was finally solved, not by dropping one of the missiles but by assigning the Army responsibility for both. (There was still a third one—a special Navy Talos for shipboard launching.) As Quarles' successor, I also had jurisdiction over the satellite program, but it never did receive the high-priority status it would have needed to get it into its orbit before the Russian sputnik.

Let us not pretend that sputnik is anything but a defeat for the United States. During World War II, when officials were trying to make light of a discouraging setback in the Burma campaign, General Joe Stilwell said impatiently, "I claim we got a hell of a beating." We might as well make the same admission regarding the Russian satellite. We did, however, go back and win in Burma. In order to go back and win the race for scientific supremacy, there are some things we must do.

We must revise our naive attitude toward basic research. The Armed Forces must understand that money spent on background research is not money thrown away. And Congress, now that it has created the National Science Foundation, should have the courage to vote it the funds it needs to carry out its many important programs.

We must give much more aid and encouragement to our educational institutions in turning out more engineers and scientists, especially at the graduate level.

We must change our public attitude toward science and scientists. At a time when Russia was building a scientific elite, we were treating our patriotic scientists

with hostility and suspicion. No one can accurately estimate the amount of damage that was done.

Finally, we must somehow reorganize the obsolete administrative structure of the armed services. There is no reason why a civilized nation should not be able to use all the money and all the talent and all the facilities of all its branches of military service on those programs which it decides are consistent with the best national interests. In the case of the space satellite we had the money and talent and facilities to do the job—but only in pieces, with the pieces trapped within the high fences surrounding the individual services. Unless we can devise without delay some means of putting the pieces together and keeping them together on a permanently functioning basis, I am afraid that we will soon find ourselves gaping at still further Russian triumphs.

Senator KEFAUVER. Thank you, Mr. Quarles.

Senator JOHNSON. The Chair will declare a 5-minute recess, and we will resume in 5 minutes.

(Whereupon, a short recess was taken.)

Senator JOHNSON. The committee will come to order.

Senator STENNIS, do you have questions you desire to ask?

Senator STENNIS. Mr. Chairman, I followed Secretary Quarles' testimony, and I waive my privilege to examine him. He has covered the matters I was interested in.

Senator JOHNSON. Senator Symington?

Senator SYMINGTON. Mr. Secretary, it is good to see you again.

Mr. QUARLES. Thank you, sir. I am happy to be here.

Senator SYMINGTON. I am a little wobbly because of the lateness of the hour.

Mr. WEISL. I think the witness is wobbly, too.

Mr. QUARLES. I am afraid so.

Senator SYMINGTON. In 1953 we had the so-called New Look, a \$7 billion cut, did we not, at that time, and we have constantly been shifting the plan for defense since that time, with adjustments down made pretty regularly. Is that about right?

Mr. QUARLES. I would comment it seems to me, Senator Symington, we have not been constantly shifting, because we held the objectives for quite a period with considerable stability. I will agree, though, that we have made, particularly recently, some substantial shifts.

Senator SYMINGTON. For instance, the fiscal year 1953 budget for research and development was \$525 million; for 1954 it was \$475 million; for 1955, \$431 million; and then we shifted accounting procedure.

But it has been my impression—especially considering the lightening of the dollar—that we have been steadily going down, have we not, so far as our expenditures are concerned in that field?

Mr. QUARLES. Senator Symington, I think the figures the Senator was reading are Air Force research and development budgets in those particular years.

Senator SYMINGTON. That is right.

Mr. QUARLES. And I note that these were the 600 account parts of the research and development budget, and also that if one takes the whole research and development expense in these years—in fact, right through this period—there would be a rising total of support for research and development. But I do not mean really to cite that as any exception to the Senator's point.

Senator SYMINGTON. Mr. Secretary, I was impressed with the able counsel's recitation of some of these statements you made in the past; and, as we have discussed before, they have worried me also.

I would like to run over a few of those from the standpoint of the record.

September 11, 1955, you said:

I think that, broadly speaking, the armed services are closer today to a unified consolidated operation than within my knowledge they ever have been.

Would you still feel that way about it?

Mr. QUARLES. I think they were closer than they ever had been. I concede your point that they still were not very close.

CAN'T SAY WHO IS AHEAD ON MISSILES

Senator SYMINGTON. Then, on November 12, 1955, you said:

The United States is ahead of the Communists in the intercontinental missiles race.

I understand you still felt that way when I was out of the room tonight; is that correct?

Mr. QUARLES. No, sir; it is not quite correct, because I mean to say as to my present feeling—I am not questioning the earlier statement—but my present feeling would be that at least I could not with assurance say that either is ahead at this time.

I do not believe that even if a person knew everything about both programs, he could answer that question.

Senator SYMINGTON. I understood that you said tonight our missile program overall is ahead of the Soviets.

Mr. QUARLES. Oh, excuse me. I did say "our missile program," but I did not say our intercontinental ballistic missile program.

Senator SYMINGTON. What do you mean by "our missile program" overall?

Mr. QUARLES. We have some several dozen, two or three dozen missile projects. And taking them all and giving them their proper relative weights, I would say that our program is ahead of their program.

Senator SYMINGTON. You mean ground to air, and air to air?

Mr. QUARLES. Yes.

Senator SYMINGTON. Falcon, Nike, those kind of things?

Mr. QUARLES. All of them; yes, sir.

Senator SYMINGTON. And then on December 3, 1955, you said:

The Soviets have more airplanes but we are superior in the number and variety of atomic weapons and the aircraft required to deliver them.

Quarles said "The 137-wing goal is 'sound.'"

That is from the Air Force Times.

Do you feel the heavy reduction in that program is also sound, from 137 wings?

Mr. QUARLES. I think the reduction in the 137-wing program under present circumstances is a sound program; yes, sir.

I would add to that that the amount of the reduction, looking ahead, is something that I still worry about. So I do not mean to be endorsing that as a future view, but just as of the present time.

Senator SYMINGTON. You say later on, in 1956—

The Russians today have plenty of medium-range bombers and have all of the bases in Europe that we are talking about are within their range and that have the capability of delivering atomic bombs against bases with more precision than we expect them to have with ballistic missiles for some time to come.

Therefore, they know and we know that the mere addition to their arsenal of a 1,500-mile missile to do the same job would not materially affect the balance of power between the two blocs.

Do you still feel that way about it?

Mr. QUARLES. Yes, sir; I do. I, however, would like to put that discussion in context, because I think the Senator will recall that there were some misinterpretations of intelligence at that time about Russian ballistic-missile work and the state of advancement of the work, and you will recall that this testimony was in connection with that general discussion.

Senator SYMINGTON. To be frank, I did not recall it, but would you put in the record any additions to the statement you would like to have, so that it would not be considered out of context?

Mr. QUARLES. I think I have said all I need to say in that connection, Senator.

WEATHER ELEMENT WAS CONSIDERED

Senator SYMINGTON. You give no weather advantage to the missile? We never had one bombing raid turned back by enemy action in World War II, but a great many turned back by weather. How about weather with a manned bomber as compared to a missile.

Mr. QUARLES. My statement was taking into consideration all factors, including weather; that is right.

Senator SYMINGTON. Then, on March 22, 1956, you said:

While it is our estimate that we are ahead of the Soviets in the guided-missile field as a whole, we know that they have emphasized the ballistic lines. We could not be surprised to find close competition in this field. We are not inclined to view the ballistic missile as more than an important addition to the arsenal.

Do you still feel that way about it?

Mr. QUARLES. I think there are two parts to that question. First, as to our relative position, and I think the words that you have quoted me saying at that time about our relative position are almost exactly the same as the words I used tonight about our relative position.

As to the importance of ballistic missiles in the whole picture, I still do feel the way I did then. But, in order not to have it taken out of context, I would like to explain why, which I did at that time, and my reason at that time was that both we and they had very powerful bomber forces with the capability of delivering atomic weapons to every place that one of these ballistic missiles could deliver an atomic weapon. And, for the time that one could see ahead, the manned bomber would be the more effective way of delivering such weapons.

And that is why I felt that the addition of a ballistic missile to do the same job was an addition to the arsenal, but not a revolutionary change.

Senator SYMINGTON. In 1957, before the House, you said:

The budget estimates for the fiscal year 1958 will, in my opinion, provide the Air Force with the funds required to maintain that deterrent strength and to improve its effectiveness.

That budget has been reduced. How do you feel about it now?

Mr. QUARLES. This was the presentation of the Air Force budget for fiscal 1958, Senator Symington?

Senator SYMINGTON. Right.

Mr. QUARLES. This was then made before—I was trying to get the time fixed in my mind.

The fiscal 1958 budget, I was principally discussing before the Congress after I moved over as Deputy Secretary of Defense. However, I do agree that the statement was made in relation to the Air Force program as it was presented at that time.

Senator SYMINGTON. On Meet the Press, on February 10, 1957, the question was asked you:

Mr. Secretary, leaving the budget for a moment—I am sure we will come back to it—your successor as the Assistant Secretary of Defense for Research said this week that Russia was still a long way behind this country, technologically, specifically in missiles.

Do you accept that statement?

You said:

I do. As a broad generalization, I think that is exactly right.

Do you still hold that opinion?

Mr. QUARLES. I still hold the opinion that in missiles as a broad generalization—and here I am speaking of the whole field and not long-range ballistic missiles—I still hold that opinion. I would say that, perhaps, one would have to modify the spread between their capability and ours. It is not as great today as it was at that time.

Senator SYMINGTON. Then, 5 days later, at the Jet Age Conference here in Washington, you said:

Our fiscal year 1958 budget will also provide for continued high-priority support of our ballistic-missile program. I am glad to report that our progress in this area has been very satisfactory, and that we feel these highly accelerated programs are on schedule.

Do you feel that way about it now?

Mr. QUARLES. Yes, sir; I feel that all those statements are correct.

Senator SYMINGTON. On October 14, 1957, you said:

In view of our own powerful air atomic deterrent forces, we can discount much of the Soviet propaganda, and we should find no cause for alarm in the launching of a sputnik or the announcement of the test of an intercontinental ballistic missile.

Do you still feel that way about it now?

Mr. QUARLES. "Cause for alarm," taken literally, I do feel that way; yes, sir.

Senator SYMINGTON. There are some other quotes here that have been given. You say in Air Force hearings, page 1559:

My opinion is that the strategic capability of the United States will still be superior to that of any other country in the year 1960, according to our present best estimates of the courses of action of the countries involved.

Do you still feel that way now?

Mr. QUARLES. Yes; I do. Yes, sir.

Senator SYMINGTON. On April 25, 1956, before the Airpower Subcommittee, I asked a question of General LeMay:

On the basis of the present program, as you understand it, and as you get intelligence on Russia, on the basis of what you know and are told about our own program, do you believe that condition will continue in the next 3, 4, or 5 years?

General LeMay said:

No, sir; I think the situation is deteriorating, that is, our relative strength vis-a-vis Russia.

Senator SYMINGTON. Do you think it is deteriorating very rapidly under the present programs?

General LeMay. Yes; I do.

I think it is fair to say that you are in disagreement there with General LeMay, are you not? You would probably remember that testimony.

Mr. QUARLES. I remember it very well; yes, Senator, and I also remember the context. The question precisely, as I remember it, to General LeMay, was in the context of certain assumptions that you asked him to make, and, on the basis of those assumptions, I feel his answer was correct. However, those assumptions proved not to have been valid, because they were stated in terms of the programs as he at that time knew them, and the programs that he was talking about were not the programs that we proceeded with on the B-52 bomber which was the matter of principal concern.

Senator SYMINGTON. What were the programs that you proceeded with in April?

STATEMENT INCLUDED ASSUMPTION AS TO RUSSIAN PRODUCTION

Mr. QUARLES. I would have to examine that to remember precisely because it goes back a way, but it was to this general effect: that when General LeMay came in, he was testifying on the basis of the last advice he had received as to the programs for the production of the B-52 bombers. This last advice that he had received proved not to have been the last Air Force decision in the matter, and not to have been the rate of production that we did in fact achieve.

Moreover, you asked him in the context of the then expected production of Russian Bisons, which he answered in the context of your question. But it has later developed that the production of Russian Bisons was by no means as great as it was at that time assumed.

Senator SYMINGTON. I think you are extrapolating a little far, if I may say so, in what he said and what I asked.

Senator Duff asked:

I would like to ask one question. Is it not true that we have the present capacity both in hardware and in personnel to make a completely catastrophic attack on the enemy in the way of retaliation?

General LEMAY. Yes, sir. I think that if war would come today, that we would do very well.

Senator DUFF. That is what I wanted to ask.

Senator SYMINGTON. I would like to ask this question. How much would that depend upon whether we in turn were hit suddenly without warning in a devastating atomic attack?

General LEMAY. If we got a complete surprise, as you saw by ability to survive a surprise attack, we would suffer very great damage. If it were down near that zero point, as you noticed on the charts, we would not have very much left. However, I do not believe it will happen that way. I answered the Senator's question on the assumption of a reasonable method of a war breaking out. Under those conditions, and they are not to our disadvantage, I think we would do very well.

That is all that has to do on this subject. Then I asked:

On the basis of the present program as you understand it and as you get intelligence on Russia.

Since that time we heavily cut our production of B-52's for SAC. We heavily cut our production planning for KC-135's for SAC. We heavily cut our maintenance and operations for SAC, and we heavily cut the research and development incident to SAC. And so if there was any difference of opinion between you and General LeMay, that would be increased now instead of reduced, would it not?

Mr. QUARLES. I am sure the Senator would want me to be sure about his statements of fact there. We were dealing with a program of the production of B-52 bombers which was subsequent to that time increased, and subsequent to that time again was held at a level of 15 a month where it is today. So that the first assumption that General LeMay was going on was not in accordance with the facts as they developed.

The second assumption that he was going on about the rate of production of Russian Bisons has also proved to be far from the facts, and I think you will recall, sir, that you asked him to answer your question on the basis of those assumptions.

Senator SYMINGTON. Let me get it straight. Are you saying that we have not cut back in 1957, that we have not cut back our planned production of B-52's, that we have not cut back our planned production of KC-135's, that we have not cut back our maintenance and operation funds and that we have not cut back some of our research and development for SAC?

Mr. QUARLES. You are asking me a good many questions. Let me take them one at a time.

Senator SYMINGTON. Let us take the 52's first.

Mr. QUARLES. All right. The facts in the case of the 52's are that we at the time of your inquiry and the particular part of the investigation that you are speaking of had a program for the buildup of B-52's to 17 a month at a date which I cannot at this time state, but which was approximately October of this present year. Subsequent to that time we increased the rate and speed of buildup of B-52 production to a rate of 20 a month which was scheduled to be effected in December of this year.

Last summer I explained to you and the committee that for what we felt were good and sufficient reasons, and for what I believe the Congress agreed were good and sufficient reasons, we would hold the rate of production of B-52's to 15 a month, which we reached last July.

Now, I agree that subsequent to that time we have both increased and decreased the planned level of production of B-52's.

The same thing applies to the planned level and speed of buildup of production of KC-135 tankers.

Senator SYMINGTON. You have me mixed up, and I thought I knew something about it when I asked the question. What Secretary McNeil called the rigid fiscal ceiling of expenditures of \$38 billion in the year planned for the fiscal year 1958—did that affect in any way B-52 production, production plans?

Mr. QUARLES. The plan for the decrease, for the holding of B-52 production to 15 a month was presented before the discussion of the ceiling and was presented on its merits as the soundest plan for the production of these bombers.

Senator SYMINGTON. Let me ask the question again and I would respectfully request you to be responsive to the question. Did the fiscal ceiling of \$38 billion that was established in the fiscal year 1958 by the Bureau of the Budget and the Department of Defense or by the Department of Defense alone, affect the planned production of B-52's?

Mr. QUARLES. I think you would have to say that it had an effect on the planned production, because it had an effect on our whole program, yes, sir.

Senator SYMINGTON. Thank you, sir. Did it affect the planned production of the KC-135's?

Mr. QUARLES. In that same sense it did, yes. The KC-135 change was, in a sense, keyed to the B-52 change because the reduction in one made it appropriate to reduce the other; but in that indirect sense the answer is yes.

Senator SYMINGTON. I do not see what is indirect about first placing a ceiling on production, and then reducing your production planning in order to conform to the ceiling, but you can word it any way you want. Now, did the \$38 billion expenditure ceiling affect in any way the maintenance and operation funds for SAC in fiscal year 1958, that we are in today?

MAINTENANCE AND OPERATION FUNDS INCREASED

Mr. QUARLES. The appropriation for maintenance and operations of the Air Force in fiscal 1958, according to my best memory, was in excess by a substantial amount of the appropriation for the same account in the previous year. The apportionment of that within the Air Force to the Strategic Air Command, I cannot testify to. It was an Air Force action after I left the Air Force.

I will be very glad to supply that for the record, but I think I know that it was a larger apportionment in 1958 than 1957, which seems to me not to justify the inference that it was cut back.

(The Department of Defense furnished the information on operation and maintenance funds as follows:)

Operation and maintenance funds allocated to SAC have increased markedly in recent years, as follows (in millions of dollars):

SAC allocation

Fiscal year 1956-----	\$381.0
Fiscal year 1957-----	435.6
Fiscal year 1958 (preliminary)-----	550.0-575.0

Senator SYMINGTON. May I repeat my question?

Mr. QUARLES. Certainly.

Senator SYMINGTON. Did the fiscal ceiling, the rigid fiscal ceiling established by the powers that be in the Department of Defense for the fiscal year 1958, affect the amount of money that was to be expended for maintenance and operations in SAC?

Mr. QUARLES. Senator Symington, there has been no rigid ceiling of any kind, as witness the fact that the so-called ceiling has been raised, so I cannot answer that question. I do not know the answer.

Senator SYMINGTON. It has been raised since when?

Mr. QUARLES. It has been raised within the last 2 months, perhaps 6 weeks. I do not remember the date.

Senator SYMINGTON. And how was it raised?

Mr. QUARLES. It was raised by an administration agreement that the budget we had regarded as a \$38 billion figure might be a \$38.4 billion figure at the calendar year end—I should have said \$38 billion all the way through—and \$38.6 billion to \$38.7 billion figure at the year end.

Senator SYMINGTON. Are you referring to the \$400 million that was agreed by the new Secretary of Defense that would be allowed to pay bills to industry?

Mr. QUARLES. I am referring to the additional \$400 million expenditure allowance, and it certainly would be used, in considerable part, to pay bills.

Senator SYMINGTON. What has that got to do with the maintenance and operation ceiling that was established on SAC?

Mr. QUARLES. I did not relate it to the maintenance and operations ceiling established on SAC. I think it probably did have some bearing upon it, because, had it been necessary to meet the original ceiling, it would have been necessary to cut back on the use of maintenance and operation funds. However, I cited it merely as evidence that there was no rigid ceiling, and not in response to a question about the maintenance and operation funds of SAC.

Senator SYMINGTON. The testimony of the Comptroller of the Defense Department was that there has always been ceilings, and this year there was a rigid ceiling of \$38 billion, and, if you were referring to the \$400 million that was granted recently to industry in order to help them with the problem created by holding up funds, that is one thing, and is not pertinent to what I said. I was referring to the ceiling maintained on maintenance and operation funds in SAC.

Let me ask this question: As a result of the \$38 billion ceiling, were there any reductions in expenditures in SAC? Were there any ceilings established on research and development funds for SAC? For example, the B-58?

Mr. QUARLES. Those are questions, Senator Symington, that deal with the Air Force program, and the details I have not followed since I left the Air Force. I will be glad to supply that for the record.

(Department of Defense memorandum on limitation of funds for the Strategic Air Command is as follows:)

LIMITATIONS ON FUNDS FOR THE STRATEGIC AIR COMMAND

No rigid, overall expenditure ceiling was imposed by the Air Force affecting procurement, research and development, and other aspects of Strategic Air Command missions as part of the effort to keep expenditures for fiscal year 1958 within the total amount allocated to the Air Force. The Air Force did, however, establish expenditure ceilings for all commands, including SAC, for funds specifically allocated to each command. In November 1957, these ceilings were rescinded and superseded by expenditure objectives.

Senator SYMINGTON. Thank you, Mr. Secretary. Do you know where the figure of \$5 billion a year for research and development the President used it in his last 2 television talks came from?

PRESIDENT USED SOUND FIGURE FOR RESEARCH AND DEVELOPMENT

Mr. QUARLES. I know it came from the Department of Defense, and I know it represented a careful tabulation of the costs that related to research and development in the three military departments. I have, myself, reviewed the figure, and I am satisfied that it is a reasonable and sound figure, and you may recall that it had been discussed with the Congress on a number of occasions, including the presentation of the budget last year.

Senator SYMINGTON. Well, now, the fiscal year 1957 figure for research and development expenditures for the entire Department of Defense was submitted to the Congress as \$1,686 million; which figure do you think is right? Is that figure right, or is the \$5 billion plus, \$5,039 million, figure right?

Mr. QUARLES. I do not think it is a matter of rightness there, Senator Symington. It is a matter of definition and, as I have, and each time I have testified on the subject, made it very clear, I think that in the appropriation account for research and development the \$1.6 billion figure is correct. In the context of the total cost of conducting these research and development programs in Defense, the \$5.2 billion figure is correct, and the \$5.2 billion figure includes support of research and development project from other accounts.

Senator SYMINGTON. Do you consider the procurement of aircraft research and development funds?

Mr. QUARLES. I consider the procurement of aircraft through the time that they are experimental aircraft for development purposes as being research and development in this broad sense.

Senator SYMINGTON. Well, I could break down that figure of \$5,039 million, which is so much higher than the research and development figure submitted to the Congress. For example, it includes salaries for administrative personnel; the costs for cutting lawns on bases where research and development activities also existed; guards and administrative facilities for air-defense units which happened to be tenanted at research and development centers; operation and maintenance costs of military ships, aircraft, and troop units used in conducting tests; and even regular military costs associated with operation and training units in the process of phasing out obsolete weapons and phasing in new weapons.

The Bureau of the Budget has just issued a document which lists actual expenditures for 1957. In this document one of the headings was "Military construction, Reserve components, research and development, and other."

The total expenditure, as I say, was \$5,039 million.

In round numbers, this document breaks down the amounts into \$2 billion for military construction of your \$5.039 billion; \$1 billion for Reserve components; \$1.5 billion for research and development; and half a billion for "Other."

Mr. QUARLES. \$1 billion for Reserve components, Senator Symington? I think there must be some error there.

Senator SYMINGTON. Yes.

Mr. QUARLES. I think also it is not a fact that there is \$2 billion in that \$5 billion account, in the \$5.2 billion figure.

There is, however, a substantial amount of construction for research and development facilities.

Senator SYMINGTON. Well, I have had the best accountant I could get go into this figure in detail. He says it could be \$4 billion, \$6 billion, \$7 billion, the way it is figured, or any figure you might want to give. But the facts are that when you submitted the figures to the Congress you submitted \$1,686 million; isn't that correct?

Mr. QUARLES. We submitted \$1,686 million as the requested appropriation for research and development in the appropriation accounting sense; yes, sir.

HOLADAY'S AUTHORITY

Senator SYMINGTON. Now, I just want to pursue several more questions on this question of organization.

Counsel was interested in that phase and so was the Senator from Tennessee.

Can Secretary Holaday give instructions on missiles to the Secretary of the Air Force?

Mr. QUARLES. My answer to that is "Yes."

Senator SYMINGTON. Is that clear in the organizational understanding now in the Department of Defense?

Mr. QUARLES. I believe it is, Senator. What is clear is a little bit hard to say, but in my best information it is clear.

Senator SYMINGTON. Then you would say that Mr. Holaday is in direct charge of the missile programs of the Army, the Navy, and the Air Force; is that correct—power delegated to him by the Secretary of Defense, and that his authority supersedes that of the Secretary of the Air Force, the Secretary of the Navy, and the Secretary of the Army?

Mr. QUARLES. No. You have used a number of words that I did not use—

Senator SYMINGTON. I did not say—

Mr. QUARLES. That did not apply, Senator Symington. The words "direct charge" bother me a little bit. He has the responsible direction of the programs in all of the departments. With that responsibility he can give instruction to the departments in respect to their programs and does, in fact, do so.

I am not sure whether I have completely answered your question, but I have tried to.

Senator SYMINGTON. I think you offer a distinction without a difference. What we have been trying to find out for some hours in these hearings is, is there a direct authority which extends to the three services; one man in charge of the missile program? As I understand your testimony here, there is, and the control of the programs on missiles in the Army, Navy, and Air Force is in the hands of one man; is that correct?

Mr. QUARLES. The direction of the program is in the hands of one man, Senator.

Senator SYMINGTON. What is the difference between "direction" and "control"? Is the administration of the program in the hands of one man?

Mr. QUARLES. I can only say, sir, you changed the word, and I assume you had a reason for doing so, and I prefer to stick to the word "direction" because I am sure I know what that means.

Senator SYMINGTON. I stand corrected, then. Is the administrative responsibility and authority of the program in the hands of one man who controls the three services?

Mr. QUARLES. The administration of the program is not in the hands of one man; no, sir. I have not testified that it was. I have testified that the direction of the program is in the hands of one man.

Senator SYMINGTON. I am trying to follow you, to the best of my ability.

How can you direct a program if you have not the right to administer it?

Mr. QUARLES. I do not say you do not have the right to administer it, because the Secretary of Defense has the legal right, I think, to take any action that he deems appropriate, of course, within congressional appropriations and other laws. I am merely bringing out that in the area of guided missiles, the Director of Guided Missiles is given that kind of authority by the Secretary of Defense.

Senator SYMINGTON. Coming back to a previous point, the staff points out that in the national security items of expenditures, military construction, Reserve components, research and development, and other, is a figure given of \$5,039 million. This is in the pamphlet entitled "1958 Federal Budget Midyear Review," put out by the, Bureau of the Budget and the Executive Office, of the President October 1957.

Mr. QUARLES. That, however, Senator Symington, is not the \$5 billion that we are talking about.

Senator SYMINGTON. Would you know where there is any other research and development figure which totals up to \$5 billion except for that figure?

Mr. QUARLES. I do not know where there is one in that pamphlet, sir; but I know where there is such a figure, yes. I will be glad to produce it for you, sir, with a detailed breakdown.

(The Department of Defense subsequently furnished the following:)

EXPLANATION OF \$5,039 MILLION SHOWN ON PAGE 45 OF THE 1958 FEDERAL BUDGET MIDYEAR REVIEW FOR MILITARY CONSTRUCTION, RESERVE COMPONENTS, RESEARCH AND DEVELOPMENT, AND OTHER

The budget document each year shows Department of Defense expenditures for military functions in terms of eight major budget categories. These are: (1) Military personnel, (2) operation and maintenance, (3) major procurement and production, (4) military construction, (5) Reserve components, (6) research and development, (7) establishmentwide activities, and (8) working capital (revolving) funds. In the 1958 Federal Budget Midyear Review published by the Bureau of the Budget in October 1957, the last five budget categories were lumped together, apparently in order to shorten the table in question. This was simply a matter of presentation and was not meant to imply that these five budget categories constituted a single program.

The \$38,377 million shown in the 1958 Federal Budget Midyear Review for Department of Defense expenditures for fiscal year 1957 was based on preliminary year-end reports. Final reports for fiscal year 1957 show that expenditures for Department of Defense military functions totaled \$38,439 million, distributed by category as follows:

<i>Category</i>	<i>Million</i>
Military personnel costs.....	\$10, 384
Operation and maintenance.....	9, 214
Major procurement and production.....	13, 649
Military public works.....	1, 906
Reserve components.....	1, 054
Research and development.....	1, 686
DOD establishmentwide activities.....	849
Working capital (revolving) funds.....	- 414
Undistributed (M accounts).....	111
Total.....	38, 439

ACTIVITIES SUPPORTING THE RESEARCH, DEVELOPMENT, TEST, AND EVALUATION PROGRAM IN THE DEPARTMENT OF DEFENSE

In connection with the discussion of the fiscal year 1957 budget, a statement was placed in the records, and its purpose was defined in the introductory paragraph as follows:

"The introduction of improved weapons and military equipment into the combat and combat-support forces of the Army, Navy, and Air Force is a complicated process covering many different, although related, activities which must be completed before a new weapon or item of military equipment can be considered as fully developed in a military sense. From a military standpoint, a new item cannot be considered as fully developed until it is capable of performing an assigned combat mission, and has been assigned for operational use by the combat or combat-support forces. The lines between 'research,' 'development,' and 'pro-

curement' cannot be drawn precisely, particularly in areas of rapidly advancing technology. For purposes of budgetary presentation a narrowly construed definition has been used for 'research and development,' which does not give the full measure of our research, development, test, and evaluation effort."

In order to modernize the military forces, it is necessary for the Department of Defense to conduct complete programs which include many different phases, starting with research and ending with the final equipping of the combat or combat-support units. These phases do not lend themselves to clear-cut identification in terms of either of time sequence or budgetary support. However, the kinds of steps necessary to provide an actual increase in military effectiveness through research, development, test, and evaluation are indicated by the following:

(1) Invention and preliminary design of definite concepts for applying scientific and technological possibilities to military requirements.

(2) Practical demonstration of new principles and components.

(3) Engineering and design of specific new items, components, and materials, for test and evaluation.

(4) Fabrication and production of new items, components, and materials, for test and evaluation.

(5) Conduct of tests for technical evaluation of new items.

(6) Conduct of tests for evaluating the producibility of new items, components, and materials.

(7) Conduct of operational suitability tests for military evaluation of new items and weapons systems.

(8) Conduct of tests and maneuvers to establish military tactics and doctrine for the combat use of the new items.

(9) Planning of supporting requirements (facilities, personnel, training, maintenance, etc.) for operational use of new items.

(10) Production engineering for quantity procurement of new items.

(11) Initial production of new items for use by the first combat units.

(12) Training and deployment of the first combat units and establishment of the necessary support (facilities, supply system, etc.).

(13) Reorganizing and retraining all combat units required to phase in new weapons and phase out obsolete weapons.

The Department of Defense has recognized the fact that the effort supported by the "Research and development" appropriations does not give a full measure of the effort devoted to the research, development, test, and evaluation programs, because support such as the procurement of items for engineering and service test are usually financed in other appropriations. The Department of Defense has also recognized the fact that the full cost of modernizing the military forces cannot be considered as research and development. In preparing this statement covering the research, development, test, and evaluation program of the Department of Defense, it was necessary to draw a line between the two extremes.

Based on data submitted by the military departments, the funds programed for research, development, test and evaluation in fiscal years 1955, 1956, 1957, and 1958 are estimated as follows:

1. Department of Defense total

[In millions of dollars]

	Fiscal year—			
	1955	1956	1957	1958 ¹
Research and development.....	1,221.1	1,493.5	1,747.0	1,701.1
Activities supporting research and development.....	344.3	445.5	639.4	549.7
Development, test, and evaluation items.....	1,826.4	1,830.1	2,804.5	3,067.8
Total.....	3,391.8	3,769.1	5,190.9	5,318.5
Army.....	612.5	718.2	1,052.4	1,378.4
Navy.....	683.7	906.5	1,355.4	1,579.9
Air Force.....	2,095.6	2,144.4	2,648.1	2,225.2
Interservice (emergency fund).....			135.0	135.0

¹ Preliminary estimates.

The above estimates are derived as follows:

2. Departmental summary

[In millions of dollars]

	Fiscal year—			
	1955	1956	1957	1958 ¹
(a) Army:				
Research and development.....	366.3	421.3	410.0	400.0
Activities supporting research and development.....	37.8	48.7	89.4	91.8
Development, test, and evaluation items.....	208.4	248.2	553.0	886.6
Total.....	612.5	718.2	1,052.4	1,378.4
(b) Navy:				
Research and development.....	434.4	474.2	492.0	505.0
Activities supporting research and development.....	51.2	106.4	130.0	110.5
Development, test, and evaluation items.....	198.1	325.9	733.4	964.4
Subtotal.....	883.7	906.5	1,355.4	1,579.9
(c) Air Force:				
Research and development.....	420.4	598.0	710.0	661.0
Activities supporting research and development.....	255.3	290.4	420.0	347.4
Development, test, and evaluation items.....	1,419.9	1,256.0	1,518.1	1,216.8
Subtotal.....	2,095.6	2,144.4	2,648.1	2,225.2
(d) Interservice (emergency fund).....			135.0	135.0

3. New obligational authority—Research and development appropriations

[Millions of dollars]

	Fiscal year—			
	1955	1956	1957	1958 ¹
Army.....	366.3	421.3	410.0	400.0
Navy.....	434.4	474.2	492.0	505.0
Air Force.....	420.4	598.0	710.0	661.0
Emergency fund.....	(²)	(²)	³ 135.0	³ 135.0
Total.....	1,221.1	1,493.5	1,747.0	1,701.0

¹ Preliminary estimates.

² Transfers included in Army, Navy and Air Force new obligational authority amounts.

³ Includes \$50,000,000 transfer authority.

4. SUPPORTING ACTIVITIES DIRECTLY RELATED TO RESEARCH AND DEVELOPMENT

Certain of the requirements in direct support of the research and development program are not included in the "Research and development" appropriations, but are included in other appropriations which provide the same general type of support for all military programs. These include military construction, industrial facilities financed under procurement appropriations, and the pay and allowances of military personnel. On the basis of detailed program data, the amounts

in these appropriations that are directly related to the activities financed under the "Research and development" appropriations are estimated as follows:

[In millions of dollars]

	Fiscal year—			
	1955	1956	1957	1958 ¹
(a) Military construction:				
Army.....	1.9	8.0	43.1	23.1
Navy.....	9.7	63.0	52.5	51.6
Air Force.....	109.3	98.5	208.6	174.1
Subtotal.....	120.9	169.5	304.2	248.8
(b) Industrial facilities:				
Army.....				12.1
Navy.....			34.5	16.5
Air Force.....	45.2	88.1	98.1	64.1
Subtotal.....	45.2	88.1	132.6	92.7
(c) Military personnel:				
Army.....	35.9	40.7	46.3	56.6
Navy.....	41.5	43.4	43.0	42.4
Air Force.....	100.8	103.8	113.3	109.2
Subtotal.....	178.2	187.9	202.6	208.2
(d) Department of Defense, total:				
Military construction.....	120.9	169.5	304.2	248.8
Industrial facilities.....	45.2	88.1	132.6	92.7
Military personnel.....	178.2	187.9	202.6	208.2
Total.....	344.3	445.5	639.4	549.7
Army.....	37.8	48.7	89.4	91.8
Navy.....	51.2	106.4	130.0	110.5
Air Force.....	255.3	290.4	420.0	347.4

¹ Preliminary estimate.

5. ITEMS UNDER DEVELOPMENT, TEST, AND EVALUATION

Many of the programs for developing new weapons and military equipment have, as the result of previous years' research efforts, reached a stage where it is necessary to procure preliminary production items in limited quantities for test and evaluation as to—

(a) The soundness of the engineering design.

(b) The feasibility of the production design.

(c) The operational suitability of weapons or equipment from a military standpoint, prior to standardization for operational use and large scale production for issue or inventory.

Major engineering changes and improvements must be made in new developments, provisionally accepted for limited production and use, to satisfy the need for achieving early operational capabilities with the most modern weapons attainable in support of national security policy. All procurement items which have been standardized or otherwise approved for service use within the military departments have been excluded from the following estimates. Procurement items

which are not standardized, to the extent they can be identified at this time, are considered as being under development, and are estimated as follows:

	Fiscal year—			
	1955	1956	1957	1958 ¹
(a) Aircraft:				
Army.....				27.5
Navy.....	60.4	10.9	445.6	589.7
Air Force.....	755.3	152.4	96.3	133.0
Subtotal.....	815.7	163.3	541.9	750.2
(b) Guided missiles:				
Army.....	168.7	83.0	453.0	689.6
Navy.....	70.0	104.3	142.6	130.8
Air Force.....	418.4	810.9	1,076.1	631.1
Subtotal.....	657.1	998.2	1,671.7	1,451.5
(c) Ships:				
Army.....				
Navy.....	41.7	177.6	62.4	169.1
Air Force.....				
Subtotal.....	41.7	177.6	62.4	169.1
(d) Other:				
Army.....	39.7	165.2	100.0	169.5
Navy.....	26.0	33.1	82.8	74.8
Air Force.....	246.2	292.7	345.7	452.7
Subtotal.....	311.9	491.0	528.5	697.0
(e) Department of Defense total:				
Aircraft.....	815.7	163.3	541.9	750.2
Guided missiles.....	657.1	998.2	1,671.7	1,451.5
Ships.....	41.7	177.6	62.4	169.1
Other.....	311.9	491.0	528.5	697.0
Total.....	1,826.4	1,830.1	2,804.5	3,067.8
Army.....	208.4	248.2	553.0	886.6
Navy.....	198.1	325.9	733.4	964.4
Air Force.....	1,419.9	1,256.0	1,518.1	1,216.8

¹ Preliminary estimates.

6. ITEMS NOT ESTIMATED

In addition to the above program items which could be identified from data presently available, there are other activities of the Department of Defense and the three military departments which provide significant support to the research and development programs, but which have not been included because the amounts applicable to the research and development program cannot be readily identified. These items include, but are not limited to, the following:

- Departmental administrative costs.
- The regular operating and maintenance cost of military ships, aircraft, and troop units used in conducting tests.
- The pay and allowances of military personnel attached to regular military units used in conducting tests other than specific operational evaluation organizations.
- Costs which are part of production contracts required for the further development of standardized items which must be adapted to other uses or improved in performance.
- The regular military costs, associated with operational and training units, required in the process of phasing out obsolete weapons and phasing in improved weapons, such as the changeover from propeller-driven aircraft to turbojet aircraft.

Senator SYMINGTON. So this figure is not the \$5 billion figure to which you refer; but it is the only figure given here for research and development.

Mr. QUARLES. Well, I am sorry I am not familiar with the exact pamphlet you have. The number is not exact if it referred to the \$5.2 billion that I spoke of in the first place.

In the second place, if it is defined in the words you read, it would not define the \$5.2 billion that I am talking about.

Senator SYMINGTON. This is part 4, Mr. Secretary, Detailed Statements Comparing Revised 1958 Budget With Previous Years. This is the only figure on research and development given in the budget.

Do you know—let's see, sputnik was October 4. We are pretty close to 8 weeks now; is that right?

Mr. QUARLES. Sputnik No. 1 was October 4; yes, sir.

THE LIMITED AREA OF ACCELERATION

Senator SYMINGTON. Yes. I meant No. 1.

Do you know of any acceleration of any procurement programs for the Army and the Navy and the Air Force, outside the missile picture, since October 4?

Mr. QUARLES. Outside of the missile picture and as of this time I do not know of any.

I also cannot say that I know there were none.

Senator SYMINGTON. You are the Deputy Secretary of Defense, are you not?

Mr. QUARLES. Yes, sir; I am.

Senator SYMINGTON. Do you know of any lifting of any overtime restrictions in any field except the missile field in the some 7½ weeks since Sputnik I?

Mr. QUARLES. There has been an overtime relief in the satellite program, as I remember it, which you may include in the missile field in your definition, and if so, the rest of the program across the board is subject to the directive that the Senator referred to earlier this afternoon, and I am not aware either of any request for relief or of any relief.

The directive, however, did, in the first place, permit overtime under certain stated conditions and did permit requests or reclama for additional overtime in case the departments felt this was desirable and we have not to the best of my knowledge received any.

Senator SYMINGTON. Well, do you know of any change from the 5-day week tempo in the production of Army, Navy, and Air Force materials outside of the missile, or/and satellite program?

Mr. QUARLES. I know of no change from the production tempo, Senator Symington.

I think to speak of it as a 5-day week tempo perhaps is not quite accurate across the board but at any rate I know of no changes since that time.

Senator SYMINGTON. Well, Mr. Secretary, a good many manufacturers have recently asked me "Why is it we don't get going? We are on a 5-day week program. We close up our plants Friday afternoon and then we have the problem, as any manufacturer knows, of getting them started again Monday morning."

You know if you have a restriction on overtime and you are on a 5-day week tempo why, after this tremendous shot in the arm we have gotten from what Dr. Teller called the technological Pearl Harbor of Sputnik I—we have to fight a war with existing forces, not with developments or blueprints of missiles.

Why is it we have not accelerated any of our Army, Navy, and Air Force existing forces? To the best of my knowledge, we have not replaced a single cut we made in the year 1957—the result of the fixed expenditure ceiling, the rigid ceiling placed on the Department of Defense this year, 1957.

Now, if this is a serious matter, and I was very much impressed with the counsel trying to find out whether you did or did not think it was a serious matter today as against some of your statements in the past, if we do have to defend ourselves with existing forces, then why don't we at least replace the cuts, slowdowns, and cutbacks that we made in the year 1957, and get off of this 5-day-week tempo?

Mr. QUARLES. I will answer that. I am glad to answer it. I am sure, with your great experience, sir, you well appreciate the fact there is no connection between a 5-day week and an order that limits overtime. You can have 2 shifts, 3 shifts, or any other number of shifts and work every hour of every week and still have no overtime, and I am sure the Senator knows that.

Senator SYMINGTON. Well, I don't know it, because you cannot work 3 shifts efficiently because you don't have any time for maintenance and overhaul, but you can work 2 shifts. On that I agree with you 100 percent.

Do you know of any order of any kind that has gone out to any manufacturer, or any supplier of the Army, Navy, or Air Force, which allows him to go to a two-shift basis since sputnik I was fired that he was not on already before sputnik I was fired?

Mr. QUARLES. I don't have detailed information, sir, but I am sure there are many places in industry serving the Military Establishment at the present time where there is more than 1 shift and more than a 40-hour, 5-day week.

HE CANNOT CITE CASE WHERE TWO SHIFTS ARE USED

Senator SYMINGTON. I am going to ask the chairman to get manufacturers to come before this committee who have asked why it is we don't get off the 5-day-week tempo. I agree we could work two shifts. I was wondering if you knew of any case since Sputnik I where we have specified to a manufacturer that he go to two shifts.

Mr. QUARLES. I cannot cite any such case.

Senator SYMINGTON. I have asked that question before, and don't know of any. I have asked that question; thank you Mr. Chairman.

Mr. WEISL. Secretary McElroy called, and he wanted to know whether you wanted to question him.

Senator SYMINGTON. Mr. Chairman, I am a little woozy. It is very late in the evening. Could I ask questions at some other time? I certainly would not want him to come down this late tonight and have all these other people wait. Some of the questions I planned to ask the Secretary I have asked the Deputy Secretary.

Senator JOHNSON. We asked the Secretary to stand by, and we are willing and anxious for him to complete his testimony.

He will be before us again, particularly, in executive session. It may be that you will want him again in open session, and we will be glad to call him if you feel it should be. If you will submit to the Chair by next Monday the list of manufacturers that you would like to have subpoenaed, the Chair will direct the counsel to prepare subpoenas and we will bring them in, pursuant to your suggestion.

Inform the Secretary that Senator Symington does not desire to continue with his interrogation this evening; that the other Senators have finished with him; and we expect to hear him in executive session after the 13th.

Senator CASE. He said he was willing to come.

Senator SYMINGTON. That is very kind of him, and I appreciate it.

Mr. Chairman, if we are going to have a declassification of classified testimony that would automatically come out if we could question him in executive session, could we not?

Senator JOHNSON. Sure. Anything that was not classified.

Senator SYMINGTON. That is right.

Senator JOHNSON. I wanted to be sure you continued your questioning of him in the same kind of session you started if, if you so desire.

Senator SYMINGTON. I appreciate your courtesy.

Senator JOHNSON. Have you finished with the witness?

Senator SYMINGTON. I have, Mr. Chairman.

Senator JOHNSON. Senator Stennis, do you have any questions?

Senator STENNIS. No further questions.

Senator JOHNSON. Mr. Kefauver, do you have any questions?

Senator KEFAUVER. No, sir.

Senator JOHNSON. Mr. Secretary, were you present during the appearance of the Secretary of Defense?

Mr. QUARLES. This afternoon I was, sir.

Senator JOHNSON. You heard his statement announcing the decision today regarding Jupiter and Thor?

Mr. QUARLES. Yes, sir.

Senator JOHNSON. You heard his response to my question as to what he felt could and should be done now to insure the maximum defense of this Nation?

Mr. QUARLES. I did, sir. In relation to the five points, do you not mean? Yes, sir.

Senator JOHNSON. You heard his general statement that, without dotting every i and crossing every t, he was in general agreement with the suggestions made to this committee by Dr. Teller?

Mr. QUARLES. Dr. Teller; yes, sir; I do.

Senator JOHNSON. Are you in agreement with the Secretary on all those points?

Mr. QUARLES. I am, sir.

IN ACCORD WITH DR. TELLER'S SUGGESTIONS

Senator JOHNSON. Do you have any suggestions that you feel you could make to this committee out of your wealth of experience that you think would contribute to increasing our defense posture and to securing this Nation?

Mr. QUARLES. Mr. Chairman, thank you. I have suggestions. I find that Dr. Teller actually summarized them very much as I would.

As the Secretary of Defense mentioned this afternoon the matter of the shelter part of his recommendations gets a bit out of our field but with that single exception as far as I know, I would say that I heartily endorse Dr. Teller's views as to the important things to do, and I do not now remember whether he included the Cordiner personnel actions, and if he did not, I should like to add that to his list as representative of the general area and very important area of improving the welfare of our, particularly of our skilled servicemen, and the attractiveness of the service, too.

Generally speaking, these would be my recommendations.

Senator STENNIS. Mr. Chairman, may I say a word on that?

Senator JOHNSON. Senator Stennis.

Senator STENNIS. Had you finished on the Cordiner—

Mr. QUARLES. Thank you, Senator.

Senator STENNIS. Yes.

Mr. Chairman, I had understood the Cordiner matter was not to be brought into these hearings. I do not particularly object to it, but there have been so many piecemeal things said about it prior to a real chance to have hearings on it, that I feel compelled, especially in view of Secretary Quarles' few remarks there, to at least say a few words about it.

I think it has a great deal of merit, the Cordiner report does, and there are some phases of it that I am certainly in favor of, but I have never known one single proposal to have as much said about it with as few supporting facts as there is about the Cordiner report.

I have read in many papers and resolutions and heard it on the floor of the Senate, that it will save \$5 billion, but when Mr. Cordiner came before our committee, subcommittee, and I gave him a chance to support that statement, he said that was not his estimate.

He made no effort to support it. He did not exactly disown it, but said it was not his, but it was the Department of Defense's.

Now, sometime about July, I sent a questionnaire over to the Department of Defense. I think there were 40 or 50 or maybe 60 questions, and as yet we have not been favored with one scratch of a reply.

And I wrote you a letter again today, saying that I thought the whole manpower problem was involved in the Cordiner report, the Cordiner hearing, and as for my part, I did not feel inclined to proceed until the Department of Defense at least tried to answer those questions or refused to answer them.

Now, in view of that—the Secretary comes here, comes here and supports the Cordiner report—it is another instance of a matter being asserted, but no proof being offered.

There is another thing about the Cordiner report, and I do not say this critically of Mr. Cordiner. I think he has done a fine job, but the primary purpose, as stated, was to increase the pay particularly of certain groups, to induce them to stay in the service.

Still, a major recommendation was that this increase would apply to men who had already retired from the service.

In view of such a glaring inconsistency, they may decide all their recommendations had better be pretty thoroughly examined.

So I repeat, we have heard it here spoken about, but never proven, and those who have been called upon to put up some proof do not reply. So I am just going to make those letters I have in mind, make

those letters public, and we will try to get the issue on the merits, and then try to decide it on the merits.

I thank you, Mr. Chairman.

Senator JOHNSON. Thank you, Senator Stennis.

Is there any other question? Senator Barrett, do you have any questions?

Mr. QUARLES. Senator Stennis, if I might, I feel I really owe Senator Stennis and his committee a bit of an apology.

I used the word "Cordiner" as a shorthand expression for a plan for improving the pay structure in an effort to increase the attractiveness of the service to the highly skilled people.

Senator STENNIS. If I may say it, Mr. Chairman, let us make clear, no one owes me an apology. This is a public matter.

But I am calling now on those who assert those things to come in and prove them, and let us put something on the line that we make some recommendations on. And we will have hearings at the convenience of the Department of Defense or anyone else who is interested, and I hope the witnesses, at least some of them, will be impartial witnesses, people who are not going to benefit personally by the legislation, one way or the other.

Mr. QUARLES. That is correct, sir.

Senator STENNIS. All right.

Senator JOHNSON. Do you have any further response?

Mr. QUARLES. Thank you, sir.

Senator JOHNSON. Senator Barrett?

Senator BARRETT. I have no questions.

I want to say I believe Secretary Quarles made a very admirable presentation of the case this evening, and it has been a long time, and I do not want to belabor the matter by further questioning at this hour.

Mr. QUARLES. Thank you, sir.

Senator JOHNSON. Thank you, Senator Barrett.

Senator Symington?

Senator SYMINGTON. One further question, Mr. Chairman.

Mr. Secretary, I have always respected your integrity and your desire to do the best job possible for our country. I think it would be a grave mistake for our national security that, because of all the hullabaloo over our missiles programs resulting from sputnik, we chased the Russians in that field, and, forgot about what we have to fight with, in case we have to defend one of our allies or are attacked ourselves.

Now, with that premise, would you be good enough to furnish the committee any directive or order that has been issued to accelerate or increase, accelerate any procurement or increase any funds for maintenance and operation or research and development, in the Army or the Navy or the Air Force, since the 4th of October? Would you furnish those to the committee?

Mr. QUARLES. I would be glad to furnish them.

Senator SYMINGTON. I say, in all sincerity, to the best of my knowledge, there are not any.

Mr. QUARLES. I am not able to cite any one, but, if there are any, I will certainly cite them, and, in any case, I will furnish an answer for the record.

(Subsequently, the Department of Defense furnished the following:)

SOME RECENT ACTIONS TAKEN TO EXPEDITE IMPORTANT PROGRAMS

1. Removal of overtime limitations on top-priority programs.
2. Restoration of basic-research programs to former level.
3. Army authorized to proceed with launching a satellite by use of Jupiter-C test vehicle. Both Vanguard and Jupiter satellite programs assigned top priority.
4. Authorized production and operational deployment of both Thor and Jupiter missile systems.
5. Acceleration of the Atlas program.
6. Acceleration of fleet ballistic missile weapons system (Polaris) in fiscal year 1958 supplemental appropriation.
7. Army authorized to proceed immediately with the development of a solid-propellant missile as a replacement for the Redstone.
8. Establishment of the Office of the Director of Guided Missiles.
9. Establishment of the Advanced Research Projects Agency.
10. Increased antisubmarine capability in fiscal year 1959 budget; also, acceleration of research and development on antisubmarine warfare.
11. SAC alert, dispersal, and relocation of tankers to northern bases.
12. Air Force authorized to proceed with program to install an early-warning system for detection of ICBM.
13. Defined Army and Air Force responsibilities and reemphasized the urgency for the development of defense against the ICBM. Top priority confirmed for anti-ICBM and military satellite projects.
14. Appointment of full-time special assistant and group of consultants to advise the Secretary as to the organization of the Defense Department.

Senator SYMINGTON. Thank you very much, Mr. Secretary, for your intelligence and your endurance.

Mr. QUARLES. Thank you, sir.

Senator JOHNSON. Any questions, Senator Kefauver?

Senator KEFAUVER. No questions, Mr. Chairman.

Senator JOHNSON. Further questions, Senator Stennis? Any further questions?

Senator STENNIS. No, thank you.

Senator JOHNSON. Any questions, Senator Case?

Senator CASE. No questions, Mr. Chairman.

Senator JOHNSON. Senator Barrett?

Senator BARRETT. No.

Senator JOHNSON. Mr. Secretary, this committee has listened very carefully—

Mr. QUARLES. Patiently.

ANOTHER PEARL HARBOR

Senator JOHNSON (continuing). And very attentively to your testimony, I think, for more than 3 hours. We have had a very long and difficult session, and I compliment you on your poise and your patience and your clarity of expression, and your ability to express yourself forcibly.

There is one comment I would like to make. I have heard your contention that we are in reasonably good shape because of our surface ships, SAC, atomic devices. The thought just occurred to me that what we are actually saying is, we are ahead in the weapons of the past, perhaps behind in the weapons of the future.

Now, this committee is going to reassemble here December 13. It is made up of seven members of the subcommittee, and each member of the Armed Services Committee is an ex officio member of this group.

I believe, as much as I believe anything in my life, that you will find there is no group of more dedicated men, no group of men anywhere that are more devoted to the interests of their country.

We found out the morning after Pearl Harbor that we had no internationalists and no isolationists. We were all Americans. We had no Democrats and no Republicans.

We meet today in the atmosphere of another Pearl Harbor, so to speak. I hope that you and your subordinates, between now and December 13, when we meet again, will give careful thought to the problems that confront us, the Congress, and will be prepared to bring forth any suggestions that you think we could act on which would be helpful to strengthen the defense of this Nation, and will give us any criticisms that you may have as to our approach to this whole problem.

We want to be fair; we want to be just. This is one Nation, indivisible. We are all good Americans, trying to do the best we can as we see it, and we are much more interested in where we are going than where we have been.

Thank you, Mr. Secretary.

The committee will take a recess until December 13.

Mr. Holaday, I want to express my great appreciation to you for your endurance, for your standing by. It is with deep regret that we are unable to hear your testimony, but you have many days to prepare it in the light of what you have observed today, and perhaps will be a better equipped witness when we come back. We look forward with great interest to hearing you.

Secretary Quarles, do you have anything to say?

Mr. QUARLES. Mr. Chairman, I wanted to make an unprecedented request of the chairman. You spoke of our being ahead in weapons of the past, and being behind in weapons of the future, and I know the whole world will be listening to your words, and I wanted to ask you if you would be willing to amend them and substitute the word "present" for "past."

Senator JOHNSON. Well, I am glad to hear your suggestion.

The committee stands adjourned.

(Whereupon, at 11:45 p. m., the subcommittee adjourned, to reconvene at 10 a. m., Friday, December 13, 1957.)

INQUIRY INTO SATELLITE AND MISSILE PROGRAMS

FRIDAY, DECEMBER 13, 1957

UNITED STATES SENATE,
PREPAREDNESS INVESTIGATING SUBCOMMITTEE,
OF THE COMMITTEE ON ARMED SERVICES,
Washington, D. C.

The subcommittee met, pursuant to recess, at 10:10 a. m., in room 318, Senate Office Building, Senator Lyndon B. Johnson (chairman of the subcommittee) presiding.

Present: Senators Johnson (Texas), Kefauver, Stennis, Symington, Saltonstall, and Flanders.

Also present: Senator Bush, member of the Committee on Armed Services, and Senator Carroll; Edwin L. Weisl, chief counsel; Cyrus R. Vance, counsel; Gerald Siegel, associate counsel; Solis Horwitz, associate counsel; Daniel F. McGillicuddy, associate counsel; Stuart P. French, associate counsel; Edwin L. Weisl, junior counsel; Dr. William V. Houston, consultant; and Dr. Edward C. Welsh, staff adviser.

Senator JOHNSON. The committee will be in order.

We are opening the second round of our hearings on the satellite and missile programs. We are going to hear the services, the groups that have actual responsibility for developing the weapons of survival.

Our first set of hearings were intended to offer us some perspective on the problems that we face. I believe you will agree that they succeeded.

It is apparent that research and development is a key problem. America's production capacity is not the question. Our production facilities supply us with the highest standard of living in the history of the world. And yet, as we meet here today, a large part of our productive capacity is idle.

Our workers are the most efficient and the most productive the world has ever known, but more than 3 million of them are today looking for jobs.

Our industrial leaders are imaginative, courageous, and able, but they are complaining already about the need for more orders to keep their factories going.

The key to the situation, as I see it, is the group of dedicated scientists and engineers who are struggling to develop the weapons of the immediate future. From the studies made by our staff, I am deeply impressed by the devotion and competence of our scientists and our engineers.

I do not believe in trying to change a statement that expresses a thought perfectly. Therefore, in referring to these scientists and engineers, I am going to paraphrase a statement that was once made by Winston Churchill.

Never in the history of human endeavor have so many depended upon so few.

We have an obligation to those men—an obligation which can be paid only by helping them to the fullest extent of our capabilities.

If these scientists and engineers need more facilities, they should have them.

If they need more resources, they should have them.

If they need better organization, it should be supplied.

If they need more dollars, they should be appropriated, and I believe they will.

And this committee meets here today to help in every way that it can.

Once the technicians have completed their job, America can swing into the production problem rapidly. The unused productive capabilities could be put into use; the unused workers could be put back to work.

The weapons themselves will come rapidly, once the development work is done.

A PLEA FOR IDEAS TO SPEED DEVELOPMENT

The committee is looking for steps that will speed the development stage. We are hoping that the witnesses in the next few days will present ideas of how they think we can best get over the hump.

We have a logjam to be broken, and the quicker it is broken, the better for all of us.

The vital necessity of speed was emphasized once again this morning. The newspapers tell us that, once again, the Soviet Union has presented the world with another poorly concealed threat.

We have entered a period of international blackmail on a scale never before practiced in history. That period will continue until once again the United States is back in the lead on technology.

We are calling as our first witness this morning the man who is in charge of the missile program for the Defense Department.

Dr. Livingston, of Harvard University, had been scheduled to appear, but he is suffering from a temporary illness and he will not testify until next week.

The first witness is William M. Holaday, the Director of Guided Missiles, of the Defense Department.

Mr. Holaday, this committee is fully aware of the tremendous responsibilities that have been laid upon your shoulders. In effect, you are the man on the spot, the man to whom the American people and the free world look for missiles.

We are interested in whether you have been granted authority equal to these grave responsibilities. We are concerned with whether you have the facilities that truly make you a director in charge of missiles, or whether you just have the title.

In order to save time, I am inserting your biography in the record. (Mr. Holaday's biographical statement follows:)

WILLIAM M. HOLADAY, DIRECTOR OF GUIDED MISSILES

Mr. Holaday, now 56 years of age, was born in New Vienna, Ohio, in 1901. He was graduated with a bachelor of mechanical engineering degree from Ohio State University in 1925, and spent the next 2 years as a development engineer with the Westinghouse Air Brake Co.

In 1927 he joined the laboratory staff of the Standard Oil Company of Indiana as an automotive engineer.

In 1937 he was named assistant manager of the general laboratories of the then Socony-Vacuum Oil Co. and became director of research in 1944.

During the war years of 1943 and 1944, Mr. Holaday was on leave of absence from the company to serve with the Petroleum Administration for War. Since 1944 he has served as a member of the Military Petroleum Advisory Board and, in a consultant capacity, for the Army, Navy, and Air Force.

Mr. Holaday is a member of the Subcommittee on Aircraft Fuels of the National Advisory Committee for Aeronautics, and has served as Chairman of that Committee's Fuels Subcommittee. For a period of time he served as a member of the Power Plants Committee of the NACA.

Mr. Holaday retired in February 1957, from the Socony-Mobil Oil Co. where he had been director of research from 1944 to 1955. He had been associated on a part-time basis with the fuels and lubricants group of the Department of Defense Research and Development Board and its successor, the Office of the Assistant Secretary (Research and Development) since February 1949. He has been Deputy Assistant Secretary of Defense (Research and Engineering) since the combination in February 1957, of the Offices of the Assistant Secretaries (Research and Development) and (Engineering). He has recently been appointed as Special Assistant for Guided Missiles in the Department of Defense.

A member of the Society of Automotive Engineers, Mr. Holaday served as its vice president in 1942. He also is a member of the Institute of Chemical Engineers, the Petroleum Institute, the Society for Testing Materials, and the Industrial Research Institute.

Senator JOHNSON. I will administer the oath, and then ask counsel to start with the first witness.

Mr. WEISL. May I suggest, Mr. Chairman, that you administer the oath to General Betts, Mr. Waggoner, and Mr. Holaday at the same time, because as I understand it, Mr. Holaday wants to call for assistance from those two gentlemen.

Senator JOHNSON. Will you stand and raise your right hand?

Do you solemnly swear that the testimony you give this committee will be the whole truth and nothing but the truth?

Mr. HOLADAY. I do.

Senator JOHNSON. Do you solemnly swear the testimony you give this committee will be the whole truth and nothing but the truth?

Mr. WAGGONER. I do.

Senator JOHNSON. Do you solemnly swear the testimony you give this committee will be the whole truth and nothing but the truth?

General BETTS. I do.

TESTIMONY OF WILLIAM M. HOLADAY, DIRECTOR OF GUIDED MISSILES, DEPARTMENT OF DEFENSE; BRIG. GEN. AUSTIN W. BETTS, MILITARY EXECUTIVE ASSISTANT TO DIRECTOR OF GUIDED MISSILES; ALVIN G. WAGGONER, CIVILIAN EXECUTIVE ASSISTANT TO DIRECTOR OF GUIDED MISSILES

Senator JOHNSON. Thank you. Sit down.

Mr. Weisl, will you proceed?

Mr. WEISL. Mr. Holaday, your title—

Senator JOHNSON. Mr. Weisl, just a moment, please.

Senator Saltonstall wants a brief description of the duties of the two assistants who will aid you, Mr. Holaday, in your testimony.

Mr. WEISL. Mr. Waggoner, will you please give your duties and your position and your responsibilities?

Mr. WAGGONER. I am Alvin G. Waggoner. I am Executive Assistant to the Director of Guided Missiles.

As a part of my responsibility, I am also Executive Secretary of the OSD Ballistic Missiles Committee.

I assist Mr. Holaday on all specific tasks which he assigns to me.

Mr. WEISL. General Betts?

General BETTS. My duties as Military Executive Assistant are to bring to Mr. Holaday's activities the advice and guidance of my military background, and act for him as his deputy when he is actually absent from the Pentagon.

Mr. WEISL. What is the function, General Betts, of the OSD Ballistic Missiles Committee? Please tell us what the OSD stands for.

General BETTS. The Ballistic Missiles Committee of the Office of the Secretary of Defense is the committee which we are discussing.

The nature of this committee is a grouping of the Assistant Secretaries of Defense who have responsibilities which have a direct effect on the guided-missile program.

The function of the committee, before Mr. Holaday was designated Director of Guided Missiles, was authoritative to the extent that it, as a committee, with Mr. Holaday as Chairman, produced what one could call the decision-making body within the area of the Secretary of Defense's responsibility.

In other words, while they did not usurp the Secretary of Defense's responsibility, they were the last word in presenting advice to him.

Mr. WEISL. And now the last word is Mr. Holaday?

General BETTS. With the direction having been put on Mr. Holaday's shoulders, the OSD Ballistic Missile Committee now becomes more advisory in nature.

Mr. WEISL. Mr. Holaday, according to the directive under which you were appointed, you are, and I quote, "the Director of Guided Missiles":

The Director of Guided Missiles will direct all activities in the Department of Defense relating to research, development, engineering, production, and procurement of guided missiles.

Is that correct?

Mr. HOLADAY. Yes, sir.

CLARIFICATION OF DIRECTOR'S FUNCTIONS

Mr. WEISL. When Secretary McElroy testified, he stated that your position was not executive but, rather, that of a coordinator; that you did not have the power or the right to direct individuals in the various branches of the military service.

Since then, in my interview with you and Mr. Dechert, counsel for the Department of Defense, it was stated that Mr. McElroy misunderstood the question.

Please clarify your powers and duties so that they are more understood or definable.

Mr. HOLADAY. Well, I will try to, Mr. Counsel.

The actual work on guided missiles is in the services, just as the Thor program is part of the Air Force activities, the Jupiter is part of the Army activities.

Our operation may be explained, using my words, that I act more like a vice president of a corporation, and that the managers are the various services to which we give directions.

Most of my directions are letters to the Secretaries of the various services, directing them to do certain kinds of work, approving a program, disapproving a program, and attempting by this method to direct the activities.

So, in effect, I think what Secretary McElroy was trying to say was that all of this research and development is not directly under my hands, in that all of these people are not part of my staff, but that we have to direct, from an organizational viewpoint, like a vice president would direct his managers of research, production, and sales, and things of that type.

Does that help, sir?

Mr. WEISL. No, sir. [Laughter.]

I understood or the committee, I believe, understood certainly from the reading of the directive issued by the Department of Defense and from the speech by the President of the United States that you are the Director of Guided Missiles, directing all activities in the Department of Defense relating to research, development, engineering, production, and procurement of guided missiles and that you have the same power as the Secretary of Defense.

Perhaps we can break it down in order to make it easier for us, Mr. Holaday.

Mr. HOLADAY. I would appreciate that.

Mr. WEISL. How do your duties compare now to what they were when you were the special assistant to the Secretary of Defense in connection with guided missiles?

Mr. HOLADAY. When I was a special assistant to the Secretary of Defense, the letters going to the various services were signed out by the Secretary of Defense.

At the present time, the letters of instructions approving programs, disapproving programs, modifying programs, are signed out directly by myself.

You understand, however, that once the policy has been established in meetings between the Secretary and myself, the Joint Chiefs of Staff, the Deputy Secretary, once the policy is established and the method and direction in which we wish to go, then I proceed to direct and issue the orders as to how the program is to be carried out.

Mr. WEISL. Now, do you issue orders to the Department of the Air Force?

Mr. HOLADAY. Do I?

Mr. WEISL. Do you; can you?

Mr. HOLADAY. Yes, sir; I do.

Mr. WEISL. Can you tell the Department of the Air Force—and when I say the “Department of the Air Force” I also include the Department of the Navy and the Department of the Army—can you tell them what missiles to put into production?

Mr. HOLADAY. Yes, sir. We review the programs, approve the amount of money going into the effort of research and development, that which goes into procurement, production, and how many missiles will be built.

Mr. WEISL. Can you cancel a program that has been instituted?

Mr. HOLADAY. Yes, sir; I think that that authority rests in my hands.

Mr. WEISL. Have you ever done that?

Mr. HOLADAY. I have not directly issued any to any service to discontinue a program.

While I was Special Assistant to the Secretary of Defense, through advice from my office, two projects were dropped.

Mr. WEISL. Do you direct the research and development departments of each of the services in connection with guided missiles?

Mr. HOLADAY. I do from a management standpoint; I do not specifically go down into the labs and tell each fellow just what to do.

Mr. WEISL. Do you keep in touch with what they are doing?

Mr. HOLADAY. Yes, sir.

Mr. WEISL. And have you the right to stop what they are doing?

Mr. HOLADAY. Yes, sir.

Mr. WEISL. Have you the right to allocate funds in connection with what they are doing?

Mr. HOLADAY. If the funds are in the budget and available for the work, I can approve that expenditure of money.

Mr. WEISL. And if the funds are in the budget, can you increase the amount of money for research and development?

Mr. HOLADAY. No, sir; not without going back and getting more money.

Mr. WEISL. I say if the funds are available.

HAS AUTHORITY TO INCREASE OR DECREASE AVAILABLE FUNDS

Mr. HOLADAY. If the funds are available, which we do quite often by reprogramming or recommending—

Mr. WEISL. I am asking whether you can do that, not "we."

Can you, as Director of Guided Missiles, where funds are available for research and development on a particular missile project, reduce or increase those funds?

Mr. HOLADAY. Yes, sir.

Mr. WEISL. What is your power or duty—

Senator JOHNSON. Counsel, Senator Saltonstall desires to propound a question.

Senator Saltonstall?

Senator SALTONSTALL. Counsel has been using the word "available" and you have been using the word "available."

Does that mean the money that has been apportioned to research by the Budget Director Brundage and by the Comptroller McNeil; is the word "available" used that way or is it used as available in the budget?

I think that ought to be made very clear.

Mr. HOLADAY. Well, sir, to answer your question, in the ballistic-missile field, we have always at the time the budget has been approved, taken the total amount of money and frozen that amount of money to give us flexibility to either increase research if this happened to be the short area, or to devote more to production if this happened to be the short area, so it is the amount of money that has been appropriated for the missile program that we can readjust.

We have no—I have no power to put any more money in there than that which can be put into the missile program.

Senator JOHNSON. I let the bar down a little bit so that Senator Saltonstall could understand what you meant by money available. I would like for counsel to go on and complete his examination.

Senator Bush desires to ask a question. I hope this will not be a precedent.

Senator BUSH. No.

Mr. Chairman, this is purely to clarify the questioning here.

Counsel is using the words "guided missile" and I wanted to be sure we were talking about Mr. Holaday's position as Director, that we are not only talking about guided missiles but about the whole field.

DIRECTIVE INCLUDES AUTHORITY AS TO ALL MISSILES

I wanted to inquire from Mr. Holaday, so we will have the record clear on it that he has charge of the whole field of missile development in the Defense Department, is that so?

Mr. HOLADAY. Yes, sir; this happened when I was made Director, all of the missiles were then put under my direction and we plan and will operate by exactly the same procedures we have used on ballistic missiles on all missile programs.

Mr. WEISL. Senator, the directive says Director of Guided Missiles, and I understood guided missiles includes all missiles.

Senator BUSH. I don't so understand; I wanted the record to be clear on that.

Senator FLANDERS. It is not true that it includes all missiles, so I think Senator Bush, Mr. Chairman, has made an important point.

Senator JOHNSON. Without questioning whether Senator Bush's questioning is important or not, I ask counsel to read into the record paragraph 3 of the directive of the Secretary of Defense creating the job of Director of Guided Missiles.

Mr. WEISL. The Department of Defense directive reads as follows:

Subject.—Director of Guided Missiles.

Purpose.—The purpose of this directive is to provide for the authoritative direction of all activities in the field of guided missiles.

2. *Responsibility and authority.*—In accordance with provisions of subsection 202, the National Security Act of 1947, as amended, and section 5 of Reorganization Plan No. 6 of 1953, there is established the office of Director of Guided Missiles.

The Director of Guided Missiles will direct all activities in the Department of Defense relating to research, development, engineering, production, and procurement of guided missiles.

Now perhaps Mr. Waggoner, you are an expert in that field, and you can clear up the definition of the term "guided missiles" as used here.

Mr. WAGGONER. In most of our papers we have used the words "guided missiles" in a very broad sense, namely, any missile which employs a guidance system which is able to modify the trajectory of the missile after it has been launched.

Now the term "ballistic missiles" has grown up.

In the literal sense it is a guided missile but because of the, shall we say, overriding importance right now of this particular item, we have to consider it somewhat out of context, consider as a point—

Mr. WEISL. Will you pardon the interruption, without going into a lengthy explanation, Mr. Holaday, General Betts and Mr. Holaday understood guided missiles to be all missiles.

Senator BUSH. Is that right?

Mr. WAGGONER. That is true.

Senator BUSH. That is the point I wanted to bring out, Mr. Counsel.

Mr. WEISL. Thank you.

Senator JOHNSON. Proceed, counsel.

I hope you will proceed with your examination.

Each Senator will be given ample opportunity to interrogate on as many subjects as desired.

Mr. WEISL. Mr. Holaday, what is your relation to the Assistant Secretary of Defense for Research and Engineering in connection with missiles?

Mr. HOLADAY. Well, sir, up until the time that I was made Director of all guided missiles, the Assistant Secretary of Defense for Research and Engineering carried a responsibility for a number of missiles such as air-to-air, some of the work in connection with ground-to-air, and some in connection with air-to-ground.

With the establishment of the new office, the primary group doing this work in research and engineering was transferred and became part of my office, in other words, my group in large total, including stenographers and men, from between 18 and 30.

Mr. WEISL. Is your relation to the service heads of research and development the same as that of the relationship that you have just explained?

Mr. HOLADAY. I do not understand your question.

Mr. WEISL. There is in each branch of the service, Navy, Army, and Air Force, a Department of Research and Development for missiles.

Is your relationship to these departments the same as that to the Assistant Secretary in charge of Research and Development for Guided Missiles or for missiles?

Mr. HOLADAY. Well, I would say that the Assistant Secretaries for Research and Development in the various services are part of those services and come under my direction as far as ballistic missiles are concerned. We meet very definitely with these gentlemen when we are reviewing research and development projects.

We meet with other people when we are discussing manufacturing; we talk with other people when we are talking about deployment of missiles.

Mr. WEISL. And that is true of basic research as well as applied research in the missile field?

Mr. HOLADAY. Yes, sir.

TRIPARTITE RESPONSIBILITY IN CONNECTION WITH MISSILES

Mr. WEISL. Now, in connection with missiles there are three problems as I understand them.

One is the development of the missile.

Two, is the development of the base or the launching platform from which the missile must be launched.

Three, the training of crews to operate and launch those missiles.

Do you have duties and responsibilities in connection with all those three stages?

Mr. HOLADAY. Well, sir, my main responsibility, of course, is in the development and production of the missile.

However, in order to have the missile be satisfactory when deployed, I do have an interest but not a direct responsibility on the method of deployment. This is a service characteristic in which I

do not even attempt to be an expert. I do use the best advice that I possibly can, and must use that in order to see that the missile will meet the methods of deployment that the service wishes to use.

Now, the training is of interest to us also in that we are interested in turning over to the service a complete missile system, and a complete missile system has, of course, a training requirement.

We have no direct responsibility over this, but we are very much interested in it to see that the missile, the ground-support equipment, the training and the methods of deployment all come out to give us an excellent or satisfactory missile system.

Mr. WEISL. I am sure you are interested in all those 3 stages, Mr. Holaday, but since a missile, in order to be operative must not only be operational as a missile but must have a base from which it is launched and a crew to operate it; do you have a responsibility to see that all those 3 factors are coordinated and available at the same time?

Mr. HOLADAY. I would say very definitely yes.

I must assume that responsibility.

Mr. WEISL. Yes.

LISTING OF VARIOUS COMMITTEES

There are various committees, scientific and engineering, in the missile field in the Department of Defense.

How many committees are there? Approximately, not exactly.

Mr. HOLADAY. In the Department of Defense—

Mr. WEISL. Mr. Waggoner or General Betts, can you help out?

Mr. HOLADAY. I doubt if we have the total in the Department of Defense. We can give you those that primarily we work with.

Mr. WEISL. Well, there is a Ballistic Committee, is there not, or a Ballistic Missile Committee?

Mr. WAGGONER. Ballistic Missile Committee?

Is that still in existence?

Mr. HOLADAY. Yes, sir.

Mr. WEISL. We cannot hear you.

Mr. HOLADAY. There is an OSD Ballistic Missiles Committee.

Mr. WEISL. What other committees are there?

Mr. HOLADAY. There is the OSD Ballistic Missiles Committee, which is the management committee for the ballistic-missiles program.

There is a scientific advisory committee, which is a group of consultants for the ballistic-missile program.

There is the coordinating Committee on Guided Missiles which was an agency or one of the committees, I should say, of the Office of the Assistant Secretary for Research and Engineering, which confined its activities to those missiles other than the ballistic missiles.

There is a special capabilities panel which confined its activities to the satellite program, to the Vanguard program.

There is the panel on aeronautics which is an advisory panel, which confines its activities to piloted aircraft and guided missiles other than the ballistic missiles.

This to my knowledge is all that there is in the Office of the Secretary of Defense.

Mr. WEISL. And there are other committees of a similar nature within each department of the military, are there not?

Mr. WAGGONER. Within the ballistic-missile program structure there is a Ballistic Missile Committee within each of the departments, in other words there is an Air Force Ballistic Missile Committee, an Army, and a Navy.

However, I think it is fair to point out that in both, in all three cases, the Chairman of these committees happens to be the Secretary of that Service, so that they are management-type committees similar to the Office of the Secretary of Defense Ballistic Missile Committee.

Mr. WEISL. Is there also a Jupiter-Thor Committee?

Mr. HOLADAY. There is an ad hoc Jupiter-Thor Committee which was formed by the Secretary of Defense in August for the purpose of reviewing the two programs to determine whether it would be feasible to provide a single missile which would meet the Air Force's operational requirements out of the Jupiter and Thor programs.

This committee, while it still, shall we say, is on the books, is currently not active.

Mr. WEISL. Do the same people sit on each of these committees or do you have different people on each of these committees?

Mr. WAGGONER. There probably is some cross-membership but in general, I think it is fair to say that the membership is different.

Mr. WEISL. Giving the best educated estimate you can, how many people are involved in all of these committees in the Defense Department and in the various branches of the military forces?

Mr. WAGGONER. There are about 20 in the ballistic missiles committees, that includes the OSD and service committees.

On the advisory committees there are probably somewhere between 25 and 40 civilian consultants.

On the other committees, I would estimate on the order of 15 to 20 people.

Senator JOHNSON. Counsel, I wonder if he could supply for the record the exact number.

Mr. WAGGONER. Yes, sir, we would be glad to do so.

Senator JOHNSON. On each.

Mr. WEISL. Yes. And Senator Kefauver suggests that you give and put in the record the names of each of the members of the various committees.

The Department of Defense furnished the following list of the principal guided missile committees within the Office of the Secretary of Defense, Army, Navy, and Air Force:

Following are the principal guided missile committees within OSD, Army, Navy, and Air Force:

OSD

1. OSD Ballistic Missiles Committee:

Mr. William M. Holaday (Chairman)

Hon. W. J. McNeil

Hon. F. S. Bryant

Hon. E. Perkins McGuire

Hon. P. D. Foote

Dr. R. W. E. Reid, BOB

Mr. A. G. Waggoner (executive secretary)

OSD—continued

2. Scientific Advisory Committee:
 - Dr. Clark B. Millikan (Chairman), California Institute of Technology
 - Dr. Hendrik W. Bode, Bell Telephone Laboratories, Inc.
 - Dr. Hugh Dryden, National Advisory Committee for Aeronautics
 - Dean John Dunning, Columbia University
 - Dr. Darol K. Froman, Los Alamos Scientific Laboratory
 - Mr. William B. Graham, RAND Corp.
 - Dr. George B. Kistiakowsky, Harvard University
 - Dr. Charles C. Lauritsen, California Institute of Technology
 - Brig. Gen. Charles A. Lindbergh, Darien, Conn.
 - Dr. Robert R. McMath, University of Michigan
 - Dr. James W. McRae, Snadia Corp.
 - Dr. J. Barkley Rosser, Cornell University
 - Prof. Jerome B. Wiesner, Massachusetts Institute of Technology
 - Dr. Herbert F. York, University of California
 - Mr. Carroll L. Zimmerman, Offutt Air Force Base, Nebr.
 - Dr. L. A. Hyland, Hughes Aircraft
 - Mr. James O. Spriggs (executive secretary), OSD
3. Advisory Group on Special Capabilities:
 - Dr. Homer J. Stewart (Chairman), California Institute of Technology
 - Dr. Robert W. Buchheim, RAND Corp.
 - Mr. H. G. Clement, RAND Corp.
 - Dr. Joseph Kaplan, University of California
 - Dr. Charles C. Lauritsen, California Institute of Technology
 - Dr. Robert R. McMath, University of Michigan
 - Dr. Richard W. Porter, General Electric Co.
 - Dr. J. Barkley Rosser, Cornell University
 - Mr. Paul A. Smith (secretary), OSD
 - Mr. James O. Spriggs (executive secretary), OSD
4. Anti-Ballistic Missiles Committee:
 - Mr. William M. Holaday (Chairman)
 - Hon. Paul D. Foote
 - Dr. William Martin, OSA R. & D.
 - Hon. Garrison Norton, Assistant Secretary Navy (Air)
 - Hon. Richard Horner, SAFRD
 - Dr. Hector Skifter (technical adviser)
 - Mr. James Bridges (technical adviser)
 - Mr. James O. Spriggs (executive secretary)
5. Research and Engineering Coordinating Committee on Guided Missiles:
 - Mr. J. B. Macauley (Chairman)
 - Mr. D. W. Patterson
 - Brig. Gen. A. W. Betts, USA (Office of Director of GM)
 - Maj. Gen. John P. Daley, USA
 - Rear Adm. John E. Clark, USN
 - Maj. Gen. J. S. Mills, USAF
 - Lt. Col. John O. Blackwell, USMC
6. Advisory Panel on Aeronautics:
 - Mr. William Littlewood (Chairman), American Airlines, Inc.
 - Mr. E. J. Barlow, RAND Corp.
 - Dr. R. R. McMath, University of Michigan
 - Maj. Gen. K. D. Nichols, USA (retired)
 - Mr. W. A. Parkins, Pratt & Whitney Aircraft
 - Mr. Carl A. Covington (secretary)
 - Dr. Hugh L. Dryden (Vice Chairman) NACA
 - Dr. Allen E. Puckett, Hughes Aircraft Co.
 - Mr. L. Eugene Root, Lockheed Aircraft Corp.
 - Mr. George Schairer, Boeing Airplane Co.
 - Dr. H. Guyford Stever, Massachusetts Institute of Technology
 - Mr. Philip B. Taylor, Sr., Sanderson & Porter, New York City
7. Thor-Jupiter Ad Hoc Committee:
 - Mr. William M. Holaday
 - Maj. Gen. John B. Medaris, USA, ABMA
 - Maj. Gen. Benjamin A. Schriever, USAF

NOTE.—All members who do not have a specific designation are in OSD.

ARMY

1. Army Ballistic Missiles Committee:
 - Hon. Wilber M. Brucker
 - Dr. William H. Martin
 - Lt. Gen. James M. Gavin, USA
 - Dr. Richard A. Weiss
 - Maj. Gen. John P. Daley, USA
 - Col. Robert E. Coffin, USA (secretary)
2. Army Scientific Advisory Panel, Subpanel on Firepower:
 - Maj. Gen. K. D. Nichols, USA (retired) (Chairman)
 - Dr. John R. Dunning, Columbia University
 - Dr. Alvin C. Graves, Los Alamos Scientific Laboratory
 - Dr. Charles C. Lauritsen, California Institute of Technology
 - Dr. James W. McRae, Sandia Corp.
 - Dr. Edward C. Stevenson, University of Virginia
 - Dr. William C. Tinus, Bell Telephone Laboratories, Inc.
 - Mr. William Webster, New England Electric System
 - Mr. Dean E. Wooldridge, The Ramo-Wooldridge Corp.
 - Dr. Herbert F. York, UCRL-Livermore
 - Maj. Gen. John P. Daley (military consultant)
 - Col. Robert E. Coffin (staff assistant)

NAVY

1. Navy Ballistic Missiles Committee:
 - Hon. Thomas S. Gates
 - Hon. Garrison Norton
 - Hon. J. Sinclair Armstrong
 - Vice Adm. T. S. Combs
 - Rear Adm. John E. Clark (executive member)
 - Commander Paul Backus (executive secretary)
2. Polaris, Submarine Steering Task Group:
 - Rear Adm. W. F. Raborn, BuOrd
 - Capt. J. B. Colwell, BuOrd
 - Mr. R. F. Racine (executive secretary), BuOrd
 - Mr. C. E. Evans, BuOrd
 - Capt. Levering Smith (Chairman), BuOrd
 - Mr. W. M. Hawkins, Lockheed Aircraft Corp.
 - Dr. L. N. Ridenour, Lockheed Aircraft Corp.
 - Capt. E. Arentzen, BuShips
 - Comdr. W. R. Riblett, BuShips
 - Comdr. P. H. Backus, CNO
 - Comdr. J. E. Volonte, CNO.
 - Dr. C. S. Draper, Massachusetts Institute of Technology
 - Mr. R. Ragan, Massachusetts Institute of Technology
 - Dr. H. Brown, University of California
 - Dr. A. Haussmann, Jr., University of California
 - Dr. P. M. Fye, Naval Ordnance Laboratory
 - Dr. H. Kurzweg, Naval Ordnance Laboratory
 - Mr. R. C. Berendsen, General Electric Co.
 - Mr. R. D. Geckler, Aerojet-General Corp.
 - Dr. E. R. Roberts, Aerojet-General Corp.
 - Capt. F. W. Walker, CNO.
 - Lt. Comdr. R. L. Long, CNO
 - Dr. G. H. Mechlin, Westinghouse Electric Corp.
 - Dr. W. L. Barrow, Sperry Gyroscope Co.

AIR FORCE

1. Air Force Ballistic Missile Committee:
 - Hon. James H. Douglas (chairman)
 - Mr. Richard E. Horner
 - Gen. C. E. LeMay, USAF
 - Mr. Dudley C. Sharp
 - Mr. Lyle S. Garlock
 - Brig. Gen. C. M. McCorkle
 - Col. R. E. Soper (secretary)

AIR FORCE—continued

2. Aircraft and Weapons Board:

Maj. Gen. James Ferguson (ex officio chairman)
Maj. Gen. R. P. Swofford
Maj. Gen. L. S. Stranathan
Maj. Gen. M. Lewis
Maj. Gen. F. A. Bogart
Maj. Gen. A. M. Kuhfeld
Maj. Gen. A. G. Hewitt
Maj. Gen. J. B. Cary
Maj. Gen. R. H. Carmichael
Maj. Gen. B. J. Webster
Maj. Gen. M. A. Preston
Brig. Gen. C. M. McCorkle
Brig. Gen. C. F. Dreyer
Brig. Gen. W. A. Davis
Col. R. G. Ruegg

Mr. WAGGONER. Pardon me, Mr. Counsel, there is one other committee which I neglected.

There is a committee within the office of the Secretary of Defense for the purpose of coordinating the activities of the anti-intercontinental ballistic missile programs.

Mr. WEISL. There is the field of the ICBM or the intercontinental ballistic missile.

There is the IRBM, then you have the surface-to-air missiles, the air-to-surface missiles.

The shorter range surface to surface missiles.

Missiles for the Navy, missiles for the Army, missiles for the Air Force, missiles for the United States Marine Corps.

Do you have direction of all of those fields?

Mr. HOLADAY. Yes, sir.

Mr. WEISL. And you must keep in touch with the activities from time to time of the Departments in the committees and the assistant secretaries and the personnel that have charge of the development and production of these missiles?

Mr. HOLADAY. Yes, sir.

Mr. WEISL. Do you also grant priorities?

Mr. HOLADAY. Yes, sir; I have made one priority ruling.

Mr. WEISL. Well, you do have charge of priorities?

Mr. HOLADAY. Yes, sir; I have to make these in consultation as you well realize.

Mr. WEISL. I beg your pardon, sir.

Mr. HOLADAY. I have to make these after a certain amount of consultation with the Joint Chiefs of Staff and other people who help me to determine how fast we should accelerate some particular part of the program.

Mr. WEISL. How many types of priority or what types of priorities are there in the Department of Defense in connection with missiles?

Mr. HOLADAY. This is a rather difficult thing because I am going back and picking up some. In the ballistic missile it is easy to answer your question but your question is so broad. In the ballistic missiles these programs are in a special category of priority.

The other missile programs are mostly in category 1.

Mr. WEISL. What is category 1, please?

Mr. HOLADAY. Category 1 is fitting these missiles in relation to other things such as airplanes, submarines and, things of this type.

Mr. WEISL. Well, is there such a thing as a top priority?

Mr. HOLADAY. There is—I think what you are driving at is a national priority deal with the IRBM and ICBM programs.

Mr. WEISL. What is below national priority?

Mr. HOLADAY. There is category 1.

Mr. WEISL. What is that? Is that a special priority or——

Mr. HOLADAY. It is a priority which is used to permit these people to get material and things to carry forward their work.

Mr. WEISL. Is that known as an industrial priority?

Mr. HOLADAY. No, I am not an expert in this field.

Mr. WEISL. Perhaps Mr. Waggoner can help us out.

Mr. HOLADAY. Can you help us?

Mr. WAGGONER. I think perhaps, Mr. Counsel, we should supply the answer for the record on this one because it does get into certain of the industrial priority aspects with which I am not too familiar.

(The Department of Defense memorandum on DOD priorities is as follows:)

DOD PRIORITIES

All military procurement is rated "DO" under the Office of Defense Mobilization—Business and Defense Service Administration Industrial Priority System. The symbol "DX" is a higher rating and takes precedence over "DO" rated orders, if necessary to meet required delivery dates. It should be noted that the "DX" rating, prior to January 1957, was utilized by BDSA only on a case-by-case basis to meet specific bottlenecks. In January of 1957 DOD was authorized by ODM to use "DX" rating on a program basis, i. e., to rate all contracts and orders for a program designated as of highest national importance.

As contrasted with the "DO" and "DX" ratings, the master urgency list is part of the system used internally within DOD to identify relative priority of segments of its procurement program. The system provides for four categories of urgency, "S" and categories 1, 2, and 3. "S" items, and those items in category "1" which need special attention are listed on the master urgency list in descending order.

It can generally be said that a "DX" program rating is part of the industrial priority system, indicating the highest national priority, and an "S" urgency assignment is part of a DOD system of relative urgencies assigned to guide DOD expediting and special assistance actions in cases of conflict between competing military program.

Mr. WEISL. The reason I believe that the committee might be interested in that is this: When Dr. Hagen testified here he stated that in connection with the Vanguard he was denied any priority and he stated that he believed that had he been given any priority he might have got the missile in the air before the Russians did.

So I was trying to find out, not for the purpose of cluttering the record, but for the purpose of informing the committee, just how many priorities there are, who passes on them, and who grants them.

Mr. WAGGONER. Well, Mr. Counsel, specifically, with regard to the aspect that you just mentioned, there is an industrial priority which is normally monitored by the Assistant Secretary of Defense for Supply and Logistics with the advice of the Joint Chiefs of Staff.

This is a more or less of a procurement-type priority.

It is a listing of the various major weapons systems, and while I am not familiar with the details of it, I do know that the ballistic-missile programs are sitting on the very top of that procurement policy.

Mr. WEISL. Mr. Holaday, Senator Saltonstall asked you to define how you determine or who determines what funds are available for a particular project and how those funds are allocated, whether they are made available by the Budget Director, and then by the Comp-

troller and when they are made available by either of these men who allocates those funds; do you, does the Comptroller, does the Budget Director?

We would like to make this as clear as we can.

Mr. HOLADAY. Well, I will try to help you there, sir, as much as I can, too.

AUTHORITY TO MAKE FROZEN FUNDS AVAILABLE

Once the money is appropriated as to a given amount of money to go into these programs, this amount of money is then frozen and is under our direction. In other words, if a certain amount of money is appropriated for the IRBM and the ICBM programs, this amount of money is frozen by us and is available for carrying out those programs.

Now, in approving the expenditure of this money, we retain the flexibility to change whether it would all go into production or whether we might use more of it on research and development. We have the flexibility, once the money is appropriated for these programs.

Mr. WEISL. When you say "we," I know you consult other people, but as the Director of this program, you have the ultimate power and responsibility?

Mr. HOLADAY. Yes, sir; I have to sign for all of them; that is right.

Mr. WEISL. Does the Comptroller allocate those funds?

Mr. HOLADAY. The Comptroller is in, of course, on the initial discussions where we are setting the policies, following the direction of the Secretary as to the amount of money, and you have him, of course, in the position of apportioning the money after we have approved it. He has this—

Mr. WEISL. Well, after the funds are allocated, can you direct the Comptroller to distribute those funds under your direction?

Mr. HOLADAY. No; I do not have that authority. I believe you have handed the Comptroller certain authority by action of Congress. Which makes it—

Mr. WEISL. Sir?

Mr. HOLADAY. The action of Congress makes the Comptroller, as I understand it, responsible for the final apportionment of the money.

Mr. WEISL. So that the Comptroller can withhold funds, even though you direct that they be used, where Congress makes those funds available?

Mr. HOLADAY. I don't believe he would do this.

Mr. WEISL. I am not saying whether he would do this or not. Has he the power to do it, even though you direct him to do it?

Mr. HOLADAY. I would have to go to the Secretary of Defense to resolve that particular difficulty, if it occurred.

Mr. WEISL. I am sorry, Mr. Holaday; I did not quite hear the answer.

Mr. HOLADAY. I said that I would have to go to the Secretary of Defense to have that problem resolved, if such a thing did happen.

Mr. WEISL. Well, let us assume that you went to the Secretary of Defense, and the Secretary of Defense believed, with your concurrence, that certain funds should be allocated that are available. Could he command the Comptroller to make them available?

Mr. HOLADAY. I would say "Yes."

Mr. WEISL. And does the same apply to the Director of the Budget, Mr. Brundage?

Mr. HOLADAY. No; I don't believe the Secretary of Defense has that power over the Director of the Budget.

Mr. WEISL. Suppose Congress appropriates money for the missile program, and you and the Secretary of Defense, after hearing all of the evidence, believe that that money is urgently needed for an ICBM or an IRBM or for some other missile.

Have you the power to make that money, which has been appropriated by Congress, made available by the Director of the Budget, Mr. Brundage?

Mr. HOLADAY. Sir, to get action on that, if it was held up at this particular point, we would have to go to the President of the United States.

Mr. WEISL. Have you had money withheld, in your experience in this missile program, by either the Comptroller or the Budget Director, which had been appropriated by the Congress?

Mr. HOLADAY. To the best of my knowledge, I cannot recall any time that the money has been withheld.

Mr. WEISL. Is that true, to the best of the knowledge of your two associates, General Betts and Mr. Waggoner, who had been in the Department longer?

Mr. WAGGONER. There have been occasional instances where the people in, or the personnel in, the Comptroller's Office requested additional information, but, in every case that I can recall, as soon as the matter was brought to our attention it was merely a matter of getting together with the appropriate individuals and straightening out the matter, and the program continued on.

Mr. WEISL. Who are the appropriate individuals that you have to get in touch with?

Mr. WAGGONER. Well, when the item is of major consequence, it results in discussions between, and I am referring now to the period prior to Mr. Holaday, to discussions between Mr. Murphree and Mr. McNeil.

Mr. WEISL. In the past, did not the Bureau of the Budget hold up funds for nuclear rockets and for nuclear airplanes?

Mr. WAGGONER. Being in the guided-missile business, sir, I cannot answer.

Mr. WEISL. You do not, either, General Betts?

General BETTS. I cannot respond to that.

Mr. WEISL. Now, with all of these—pardon me, Mr. Holaday; who appointed these various committees that have been listed here by you and your associates?

Mr. HOLADAY. The ballistic—

Mr. WEISL. Don't go into each of them, but I mean who appointed most of them or all of them? Are they appointed by the Secretary of Defense?

Mr. HOLADAY. By the Secretary of Defense.

Mr. WEISL. You have no voice in the appointments?

Mr. HOLADAY. I certainly make the recommendations.

Mr. WEISL. And the Secretary can change the appointments from time to time, if he wishes to?

Mr. HOLADAY. Yes, sir. I have made certain recommendations for additions to these committees, and he has abided by my recommendation.

Mr. WEISL. You mean you have created new committees or put additional men on existing committees?

Mr. HOLADAY. Put new men on and, in certain cases, dropped certain people off.

Mr. WEISL. Yes, sir. Now, with all of those duties and responsibilities, keeping in touch with the missile program in the Defense Department, in the research department, in the various military departments, what kind of an organization do you have to help you do this?

Mr. HOLADAY. I had, until the Office was modified, I believe, 8 or 9 people.

In addition to Mr. Waggoner and General Betts, I had 3 military representatives; 1 from the Army, the Navy and Air Force, and, in addition to this, some 3 or 4 other civil servants to assist me. We now have added to this, until there is probably in the neighborhood of 14 or 15. I could make this complete, if you would like to have me put it into the record.

Mr. WEISL. Now, your relationship to these committees, as I understand it, is to keep in touch with them, to seek their advice and their help in connection with all your problems connected with missiles.

Mr. HOLADAY. The Scientific Advisory Committee: I present them with problems to advise me and recommend to me their best solution of them. They also have the perfect freedom to make any recommendations that they feel that I should have.

Mr. WEISL. Do they have any authority to issue directives, sir?

Mr. HOLADAY. No, sir.

Mr. WEISL. Do they have any authority to issue any orders?

Mr. HOLADAY. No, sir.

MR. HOLADAY'S PUBLIC POSITION ON MISSILE PROGRESS

Mr. WEISL. Now, Mr. Holaday, since your appointment as Director of the missile program, you have made known to the public in public addresses your estimate and your views of the missile program; have you not?

Mr. HOLADAY. I have—I believe you have reference to one speech which I have given.

Mr. WEISL. Yes, sir.

On December 5, 1957, you made a speech which was publicly reported throughout the world concerning our missile and satellite program; did you not?

Mr. HOLADAY. Yes, sir.

Mr. WEISL. And in order that the record be clear, in that speech you did point out the danger and the necessity for the United States to tighten its belt and to meet this challenge?

Mr. HOLADAY. Yes, sir.

Mr. WEISL. In that speech you made the following statement:

Many of you here tonight have an active part in the missile program—you were talking to the American Rocket Society?

Mr. HOLADAY. Yes, sir.

Mr. WEISL. You said:

You know as well as I do that we are not as far behind as some of our journalistic friends and commentators think we are.

To listen to some of these so-called experts who are backed by half-information, all seems lost, and we have sunk to a position of second-rate power in the world. Such is not the case.

My staff and myself have examined as far back as we could the journalistic comments about Russia's position in this field vis-a-vis our position, and we have found, Mr. Holaday, that our journalistic friends as far back as 1947, and continuing to date, have been far ahead of the Government officials in estimating the strength and the leadership of Russia in the missile and satellite field.

May I call your attention to statements made by the Chairman of the Atomic Energy Commission 2 years ago, Mr. Strauss, in which he stated as follows:

In 5 years

this was 2 years ago—

our lead in the training of scientists and engineers may be wiped out and in 10 years we will be hopelessly outstripped unless immediate steps are taken to correct it.

That was 2 years ago.

Would you say, judging from recent events, that the situation is better now than it was when Admiral Strauss spoke?

Mr. HOLADAY. No, sir; I agree with him 100 percent, and in the latter part of the speech I think that you will find that I have definitely confirmed that statement.

Mr. WEISL. I will put the speech in the record, Mr. Holaday, and give it to you and let you correct every statement that I make or amend it or add to it.

Senator JOHNSON. Will counsel give the date of the speech?

Mr. WEISL. The date of the speech is December 5, 1957, approximately 1 week ago.

Senator JOHNSON. That was 1 day before the Vanguard failure.

Mr. WEISL. Let me call your attention to another statement made by Gordon Dean, who preceded Mr. Strauss as Chairman of the Atomic Energy Commission, and I quote:

We have consistently underrated the technological and production achievements of the Russians and it is now time we stopped doing it. Her performance during and since World War II is there for us to see and it is time we started to believe what we see.

You agree with that statement made by Chairman Dean who preceded Chairman Strauss?

Mr. HOLADAY. Yes, sir.

Mr. WEISL. As head of the Atomic Energy Commission?

Mr. HOLADAY. Yes, sir.

Mr. WEISL. Don't you think it adds to the complacency of the people when you accuse our journalistic friends of speaking half-truths?

Mr. HOLADAY. I think you should separate the sentence.

I was not criticizing the press. I was attempting here, sir, to indicate that we must roll up our sleeves and go to work.

Mr. WEISL. Yes, sir.

In that same address you stated as follows:

We have hardware today which is easily capable of launching large satellites. So when I say that many of you here tonight will participate in the satellite program, I mean that we will be able to have large satellites whenever we want them.

Do you think that was a fair statement?

Mr. HOLADAY. Yes, sir; I would like to answer that in detail in executive session, sir.

Mr. WEISL. This is a correct quote from your speech; is it not?

Mr. HOLADAY. Yes, sir.

Senator SYMINGTON. Mr. Counsel, will you read that again?

I am sorry; I missed it.

Senator JOHNSON. Senator Symington asked that you reread the portion of the speech that you just read.

Senator SYMINGTON. Thank you, Mr. Chairman.

Mr. WEISL (reading):

We have hardware today which is easily capable of launching large satellites. So when I say that many of you here tonight will participate in the satellite program, I mean that we will be able to have large satellites whenever we want them.

Senator JOHNSON. Now, Mr. Holaday, would you please place in the record your reasons for wanting to answer this public statement, saying we could fire big satellites any time we wanted to, why you would want to answer that in executive session, so the record will be clear and the committee may know?

Mr. HOLADAY. Well—

Senator JOHNSON. The reason you chose to answer counsel's question in executive session?

Mr. HOLADAY. In answering the question in detail, I will have to talk about military possibilities and military equipment, and I do not believe that I can disclose that in an open meeting.

I would like very much to give the information to you in a closed session, it all being classified, sir.

Senator JOHNSON. Military equipment and military matters that, in your opinion, the Russians do not already know?

Mr. HOLADAY. Well, I don't believe they know all the plans.

I don't know exactly what the Russians know, but it is my feeling that it would be of considerable help to the Russians if I disclosed to the public exactly the possibilities we have here for launching this type of a satellite.

Senator JOHNSON. And the reasons that you held back deliberately?

Mr. HOLADAY. Yes, sir.

Senator JOHNSON. Thank you.

Then, Mr. Holaday, we will hear you in executive session and we will ask that the Defense Department be prepared to promptly review your testimony in order that all of it which does not breach security may be made public as promptly as possible. Is that agreeable to you?

Mr. HOLADAY. That is very agreeable.

Senator JOHNSON. Thank you.

You may proceed, counsel.

Mr. WEISL. In that same address, Mr. Holaday, you stated as follows, and I quote:

When we are assured of an adequate IRBM capability, and an ICBM system with the necessary support equipment and stockpile of missiles, then we intend

to jump into space. To do so beforehand would be like trying to lock the front door and let the back door stay open.

Is that a direct quote?

Mr. HOLADAY. Yes, sir. And there is —

Mr. WEISL. You do not believe we should place any satellite in orbit until we get an adequate supply of ICBM's and IRBM's?

Mr. HOLADAY. Mr. Counsel, will you please finish the rest of the quote?

Mr. WEISL (reading):

This does not mean that we will discontinue space work. We will have an effective and continuing program. But missiles will be our No. 1 job.

Mr. HOLADAY. I agree with that statement.

Mr. WEISL. I might say that the Air Force, I believe, and the Army, do not agree. They believe that the space program should have equal priority with the missile program, and that each is not exclusive of the other in development or operation in point of time or otherwise.

Mr. HOLADAY. That is probably true, sir. I may have to change my mind.

Senator JOHNSON. I did not hear that answer.

Mr. HOLADAY. I say that is true. I may even have to change my mind.

Senator JOHNSON. But you have not changed it?

Mr. HOLADAY. At the present time, personally, I believe that the IRBM and the ICBM missiles are more important to the American public.

Senator JOHNSON. But you still believe that we could launch a satellite if we wanted to, and could have had it prior to their launching one?

Mr. HOLADAY. Launching prior to theirs?

Senator JOHNSON. Yes.

Mr. HOLADAY. This is going back into past history.

Senator JOHNSON. Yes. We are going to have to do a little of that as we go along. [Laughter.]

Mr. HOLADAY. Well, I am sure that since I affirm my previous statements, that we can launch satellites, I think this is possible, and I think a sound and basic program here on satellites and space travel is part of what we will need for continuation of even some of our ICBM work, particularly leading into the future.

It is a question of where we put our emphasis. My statement made at that particular time was to indicate that I believe our emphasis must be placed on the ballistic missiles at this time, carrying along with it a sound and basic space-travel program.

Senator JOHNSON. All I want to clear up is that I gathered from this article that you felt that this country could send large satellites into space any time it wanted to; and, of course, I was very interested, if that were true, if we could do it, why we did not do it.

Mr. HOLADAY. Well, sir, what I stated there was the ability we have. When I say "any time," this does not mean tomorrow. If you asked me to put one of these large satellites up, that this could be done.

We have the ability to do it, but we would still require the engineers to completely put this material together in order to launch the satellite.

Senator JOHNSON. Thank you.

Senator SYMINGTON. Mr. Chairman, may I ask a question there for clarification, one question?

Senator JOHNSON. Senator Symington.

Senator SYMINGTON. Mr. Secretary, Mr. Director, you said you could not discuss this further in an open session because you would have to discuss our military possibilities.

On the other hand, as I listened to counsel read the quote, you say we can do it now.

Would you want to say that you would have to discuss our military actualities, if we can do it now? Would you want to rephrase your answer?

Mr. HOLADAY. What particularly, Senator, I am trying to stay away from is to disclose the combinations of military missiles that we would use in an attempt of this kind.

Senator SYMINGTON. Just let me repeat my question.

You said that in order to discuss it, you would prefer to discuss it in executive session because you would have to discuss military possibilities.

As I listened to the counsel, you gave the impression to the American people that we could put the satellite up at this time if we wanted to.

My question is, therefore, would we not listen to you on military actualities in executive session instead of military possibilities?

Mr. HOLADAY. Yes, sir.

Senator SYMINGTON. Thank you.

Senator JOHNSON. Proceed, Counsel.

CLARIFICATION OF STATEMENT THAT ATLAS WAS OPERATIONAL

Mr. WEISL. Mr. Holaday, in that same address you stated, and I quote:

Atlas, our first ICBM to become operational, was given a top level priority long before sputniks were heard of.

Is the Atlas operational?

Mr. HOLADAY. To become operational.

Mr. WEISL. Well, you say "Atlas, our first ICBM to become operational."

Mr. HOLADAY. That is right.

Mr. WEISL. Would that not indicate to the average layman that we have an operational Atlas?

Mr. HOLADAY. Sir?

Mr. WEISL. I quote the language exactly.

Mr. HOLADAY. I say "to become operational."

Mr. WEISL. No; you say "our first ICBM to become operational was given to top level priority long before sputniks were heard of."

Mr. HOLADAY. That is right. It is the first ICBM to become operational.

Mr. WEISL. You could have said that the ICBM "will become operational," couldn't you have said that, or "which will become operational," so that the average unsophisticated or even sophisticated layman could not be misled into believing that we have an operational ICBM?

Mr. HOLADAY. This is semantics that we are into. There was no attempt on my part to mislead the public.

Mr. WEISL. I am sure of that, Mr. Holaday. On the other hand, you do believe that responsible public officials should exercise great care in order not to mislead the public or give them a sense of complacency as to the present posture in which this country finds itself, do you not?

Mr. HOLADAY. That is true. I agree with you as to our responsibility.

Mr. WEISL. As a matter of fact, the Atlas has never been tested fully?

Mr. HOLADAY. We have not had a successful flight of the Atlas, you are correct.

Mr. WEISL. Well, don't you think—and I am not doing this, I assure you, Mr. Holaday, to criticize or to badger you, but I do believe the committee and the public want to feel that they can understand what responsible officials tell them.

Don't you think that it was a little or could be misleading to say, "Atlas, our first ICBM to become operational, was given a top-level priority long before sputniks were heard of," when we know that Atlas has never been tested successfully?

Now, Mr. Holaday, in connection—

Senator JOHNSON. Does he desire to respond to that statement?

Mr. HOLADAY. Well, I didn't know whether it was better for me to respond or to let it go. [Laughter.]

Senator JOHNSON. That is a matter on which you are at liberty to exercise your own judgment. I want to give you the opportunity, though, if you would care to.

Mr. HOLADAY. I would, Mr. Chairman, like to make this statement: I was talking that evening primarily to scientists and engineers. Probably half of the people there I knew personally. We do have this difficulty of talking to people of this type and then having the same material reinterpreted again to the entire public, and it makes it very difficult for you to talk to scientists and engineers where you do have a feeling of understanding, and still have that same information reproduced into the press.

I understand the difficulty. I think, as you pointed out to me, Mr. Counsel, it would be better if I never gave a speech. I think that is very good advice.

On the other side, I feel like I have a responsibility to the public, and certainly to my engineering and scientific friends.

Mr. WEISL. I am sure of that, Mr. Holaday, but this was a public address. This was not a closed, secret session with scientists.

Mr. HOLADAY. Well, it was not a closed session; that is true.

Mr. WEISL. And there were reporters there. And wasn't the speech broadcast over the radio?

Mr. HOLADAY. No, sir; no, sir.

VIEWS OF THE SCIENTIFIC COMMUNITY

Mr. WEISL. Now, in connection with your view that the satellite program should have a second position to the ballistic-missile program, and in connection with other matters relating to the missile program, Senator Johnson's staff and myself have written letters and interviewed approximately 75 people in industry connected with this program, and also scientists and technologists working on the program,

both in industry and in Government, and I would like to read to you some of the responses in that connection that we have received, and ask your comment, if you care to make any, thereon.

Are you familiar with the National Advisory Committee for Aeronautics, Lewis Flight Propulsion Laboratory?

Mr. HOLADAY. Yes, sir. I am a member of one of their committees.

Mr. WEISL. And that is located in Langley Aeronautic—Langley Field, Va.?

Mr. HOLADAY. Well, the Lewis Laboratory is located in Cleveland, sir.

Mr. WEISL. Has it a status in any way, directly or indirectly, with the Government?

Mr. HOLADAY. Yes, sir.

Mr. WEISL. The Associate Director of that enterprise wrote to us in a letter dated December 11, the day before yesterday, as follows, and I quote:

I am most deeply concerned about the current status of research and development on advanced missiles, satellites and vehicles. The crash program emphasis on the current ballistic missiles has created an unbalance in the national program so that emphasis and expenditures for research and development on advanced systems have been inadequate.

We are now faced, I believe, with the necessity of creating a crash program of research and development on advanced missile systems, satellites, and space vehicles.

Does that not indicate that that organization of which you are a member believes that there should be a crash program on all three, satellites, ballistic missiles, and space vehicles?

Mr. HOLADAY. Well, I interpret what the man says—who wrote the letter?

Mr. WEISL. Abe Silverstein, Associate Director.

Mr. HOLADAY. Yes.

Mr. WEISL. National Advisory Committee for Aeronautics, Lewis Flight Propulsion Laboratory, 21000 Brookpark Road, Cleveland, Ohio.

CONCURS IN VIEW OF INCREASED NEED FOR RESEARCH AND DEVELOPMENT

Mr. HOLADAY. Yes, sir. I know Mr. Silverstein quite well.

I believe, as I interpret what he says, sir, and it may be correct or incorrect, that he is talking about the increased need of research and development. This, I concur 100 percent with Mr. Silverstein in the need of greater research and development; whether it is in space, whether it is on materials, whether it is in nuclear energy, we do need this increased effort.

Mr. WEISL. He is not talking about increased effort. He is talking about a crash program.

Mr. HOLADAY. A crash on research and development.

Mr. WEISL. Yes, sir.

May I read it again to you?

Mr. HOLADAY. Yes, sir.

Mr. WEISL. I will give you the letter so that you can have it after this is over. I will read it again. He used the words:

We are now faced with the necessity of creating a crash program of research and development on advanced missile systems, satellites, and other space vehicles.

(The letter from Mr. Silverstein referred to above follows.)

NATIONAL ADVISORY COMMITTEE FOR AERONAUTICS,
LEWIS FLIGHT PROPULSION LABORATORY,
Cleveland, Ohio, December 11, 1957.

UNITED STATES SENATE,
COMMITTEE ON ARMED SERVICES,
SENATE PREPAREDNESS INVESTIGATING SUBCOMMITTEE,
Washington, D. C.
(Attention: Edwin L. Weisl, special counsel.)

DEAR SIR: I appreciate this opportunity for serving the Senate Preparedness Subcommittee. Before explicitly answering the four questions of your inquiry I should like briefly to review my participation in the current missile and satellite programs.

As you know, these present programs are largely directed toward the development and construction of hardware such as rockets, guidance systems, and structures and the assembly of these components into missiles. In the propulsion field in which I am especially qualified the programs have required no major basic research effort since the rocket engines are scaled-up developments of earlier engines in which the basic technology was reasonably well established.

As Associate Director of the Lewis Flight Propulsion Laboratory of the NACA my thoughts and efforts have been absorbed in the creation of an advanced technology for air-breathing, rocket, and nuclear propulsion systems applicable to the next generation of aircraft, missiles, and satellites. My contact with the present development programs has, therefore, not been intimate. I have been briefed on the programs in the several defense advisory boards and committees on which I serve. I am not thoroughly informed on the administrative and operational difficulties of the various defense agencies and industries who have participated in the program.

With these qualifying remarks specific answers to your questions are as follows:

(1) I believe there has been an adequate and proper use of scientific manpower. The late start and rapid acceleration of the program required excessive manpower, but this inefficiency attends all crash programs.

(2) My personal participation in the present missile and satellite programs has been so limited that I have encountered no bottlenecks.

(3) In technical reviews of the missile program by advisory boards and committees in which I have participated no major bottlenecks in the program were revealed. Quite to the contrary one of the review groups on liquid rocket engines on which I served, commented as follows "Developments on some large liquid-rocket engines are progressing at an extremely rapid and gratifying pace. The progress made by both the Rocketdyne Division of North American Aviation, Inc. and Aerojet-General Corp. in the development of the liquid-oxygen-hydrocarbon fueled rocket in sizes up to 150,000-pound thrust reflects credit on the industry and the military services that sponsored and directed the programs."

In the satellite development the delays are believed to be caused not by bottlenecks but by the development time required to produce new rocket and guidance hardware specifically for the satellite. Ground rules enabling existing military hardware to be applied in the satellite program would have been most beneficial in expediting its progress.

(4) Little can be done effectively now to expedite the development and production of the present line of ballistic missiles. Adequate financial support as requested by the defense agencies is, of course, required. Reorganization or other expediting methods may slow down rather than speed up the program.

I am most deeply concerned about the current status of research and development on advanced missiles, satellites, and space vehicles. The "Crash program" emphasis on the current ballistic missiles has created an unbalance in the national program so that emphasis and expenditures for research and development on advanced systems have been inadequate. We are now faced, I believe, with the necessity of creating, in as orderly a way as possible, a crash program of research and development on advanced missile systems, satellites, and other space vehicles. Extreme care in organization and implementation of the effort will be required to achieve the most efficient use of our national manpower and dollar resources. The program will be costly, but is absolutely essential to our national security and to the existence of a free world.

Sincerely,

ABE SILVERSTEIN,
Associate Director.

May I read to you what the Superintendent of Atmosphere and Astrophysics of the United States Naval Research Laboratory wrote on the 9th of December of this year.

Senator JOHNSON. Could we make it abundantly clear that the witness is in complete agreement with the quotations read from the other letter?

Mr. HOLADAY. I am in agreement as I interpret it—the need of a crash program for research and development in the areas of missiles, space flight, and so forth.

Senator JOHNSON. Have you taken steps to make recommendations to insure that being brought about?

CRASH PROGRAM MUST START WITH EDUCATION

Mr. HOLADAY. Well, I would say the answer to that is, yes, in accelerating the effort. But back of this, I would like to say that we need a deeper consideration of the entire problem.

Senator JOHNSON. By whom?

Mr. HOLADAY. By all of us.

You do not accelerate research and development by just telling people to do it. We do have to create the problem, the atmosphere, and the men. While we may attempt to crash into research and development at this particular time, this is certainly one of the long-pull areas which starts with our children, and the educational system, the building up of this whole thing; so that crashing is a long pull, in my opinion.

Senator JOHNSON. So your feeling is that the crash program would involve not only our educational system and revitalizing it or reworking it, but additional men and additional money.

Mr. HOLADAY. Yes, sir.

Senator JOHNSON. Now, as Director of Missiles, have you asked for those additional men, that additional money, and have you made your suggestions as to the course our education should take?

Mr. HOLADAY. Well, sir, I certainly have been part of the increased amount of effort for research and development, which is the increase which we hope to ask for the research and development in the new budget. I do not wish to disclose the numbers at the present time. I have had many conferences with Dr. Killian since he has been in Washington, encouraging further consideration of this question of education. I sometimes personally feel that we are maybe devoting too much of the jump-here and jump-there attitude at the present time and not facing up to what I believe is very basic in this long pull, and that is this education of our youngsters to bring them forward.

We may crash here, and if we forget this problem tomorrow we may fall flat on our face. And this is what I am attempting to say here, that education, development of scientists, I think is, and should be, our No. 1 project. It is a long pull, and we should very definitely keep this in mind as to those areas which we should study and try to get all of the people in the United States to help us on this.

Senator JOHNSON. Would it be fair to say that with respect to all of those elements that would go into a crash program for research and development, you have already made your recommendations in writing?

Mr. HOLADAY. I have—I don't think I have much of it in writing sir.

Senator JOHNSON. You do not make recommendations, in your position, in writing?

Mr. HOLADAY. Yes, we write an awful lot.

Senator JOHNSON. Have you made them in writing?

Mr. HOLADAY. Not in connection with the increase on education, except in the speech which I gave in New York.

Senator JOHNSON. I am talking about all the elements that go into it as you described them, increased amounts of money, increased number of men, change in our educational system, and so forth.

Now, in your present position, and since you have made those recommendations, I assume you made them to your superior, who would be the Secretary of Defense—you report directly to him, do you not?

Mr. HOLADAY. Yes, sir.

Senator JOHNSON. Now, I do not want to prolong this. I am violating one of my own rules, and I apologize to the other members of the committee.

But I would like for you to submit at this point in the record a synopsis of the recommendations that you have made to accelerate the research and development program which would show that, in your judgment, you have recommended a crash program for research and development as envisaged by Mr. Silverstein. If you will just supply that for the record, the dates of the letters, the memos or the recommendations, the dates of the conferences, and a brief synopsis of what they pertain to, the members of this committee who study the record may read it. I think the country would want to know that as one who has assumed your responsibility, terrifying and frightening as it could be, you have already taken such steps. I think the fact that you have taken steps, if you have, would be of great comfort to our people.

Thank you, Counsel.

(The information referred to is included in the classified record of the subcommittee.)

COMPLAINT FROM NAVAL RESEARCH LABORATORY OFFICIALS

Mr. WEISL. Mr. Holaday, I have here a letter from the United States Naval Research Laboratory, which I believe is one of the oldest military laboratories in the country, signed by the Superintendent of Atmosphere and Astrophysics, Dr. Homer E. Newell, Jr. The letter will be inserted in the record.

(The material referred to is as follows:)

UNITED STATES NAVAL RESEARCH LABORATORY,
Washington, D. C., December 9, 1957.

Mr. EDWIN L. WEISL,

*Special Counsel, Senate Preparedness Investigating Subcommittee,
United States Senate, Washington, D. C.*

DEAR SIR: This letter replies to your inquiry of December 3, 1957. Before proceeding to your specific questions, I should like to make a few general remarks.

During the past 10 years I have been concerned primarily with rocket exploration of the upper atmosphere (see the enclosed report, *The Challenge to United States Leadership in Rocket Sounding of the Upper Atmosphere*), and with planning and preparing for using artificial earth satellites for geophysical and solar research. For this reason you will find that my answers to your questions

are given from the point of view of a basic research scientist rather than from the point of view of a missile engineer.

It is my opinion that a strong basic research program is essential to continuing vitality of applied research and development in missiles or any other military or peacetime applications. New facts, new ideas, new techniques, new materials, new instruments, all come from the basic research effort, and are not forthcoming in adequate abundance when the basic research lags.

Basic research is the search for new knowledge for the sake of knowledge, and can be carried out only in that spirit. It should not be confused with applied research and development, the end products of which are prescribed, often quite rigidly, in advance. Nevertheless practical applications always come from broad, vigorous, and sound basic research activities. These practical applications, however, come from unpredictable directions in unpredictable ways.

In the case of missiles, satellites, and manned space stations one can list some of the basic research areas that must be strongly prosecuted to provide necessary support to the applied research, development, and operations. These include: geophysics, particularly upper air research; solar research; astronomy and astrophysics; materials; propulsion; aerodynamics; medicine; law: rocket sounding and satellite research.

Question 1

A tremendous amount of time has been taken, during recent years especially, for the preparation and giving of briefings, reports, etc. in a struggle to keep basic research alive and to obtain the necessary support and funds. This has been particularly true in my own field of rocket exploration of the upper atmosphere. It is recognized that there will always be a need for this sort of thing, but in my opinion the amount of time required in recent years has been greatly excessive.

In this country there has not been adequate effort in rocket sounding of the upper atmosphere. There have been many important scientific problems that have lain dormant because of lack of money and personnel to attack them. I would say that the national effort has been about 50 percent of what it should have been, considering these important problems that have remained dormant. At the Naval Research Laboratory the effort, because of lack of money and personnel, has been less than 50 percent of what it should have been on the above basis.

Questions 2 and 3

The bottlenecks that I have encountered have been of three types: (a) administrative, (b) lack of money, and (c) lack of personnel. Actually there is considerable overlap between and among these categories.

(a) *Administrative*.—The Viking, which was begun in 1946, was developed as an upper air research vehicle. The rocket itself, the techniques learned, and the associated equipment developed, formed the nucleus for further development into a ballistic missile system. Nevertheless NRL never could obtain the financial support to carry out such a development. In 1952 the Laboratory pointed out to the Navy the importance of ballistic weapons to military preparedness, and showed in detail how the Viking experience and hardware could be used as the basis for the development of a medium range ballistic weapon usable from land, ship, or submarine. But such a project was never funded.

When the ballistic missile proposals failed to receive support, NRL decided to use the Viking as a supporting research vehicle to obtain data important to missile development. Because of its costliness it was difficult for NRL to fund this project, and since appeals to both the Navy and Air Force brought no support the project was about to go under, when the Vanguard program came along. It was the Viking experience and hardware that put NRL in a position to undertake the Vanguard work.

Basic research in the Department of Defense suffers by being swallowed up in and made subservient to applied research and development programs. It suffers in competing with such programs for money, personnel, facilities, and support in general. What is needed is a permanent, competent, and adequate staff of scientists at the DOD level to provide leadership in basic and applied research. By leadership I do not mean detailed direction; I mean the actual doing of high quality, imaginative, comprehensive, and dynamic research, the participation in scientific pioneering. In my opinion a purely coordinative office that is not involved in the doing will not be effective. By adequate staff, I mean something in the nature of a complete laboratory covering in a broad way physics, chemistry, and engineering. In asking that such a laboratory be placed at DOD level I am looking to securing a position for it where leadership can be asserted within the military, where the needs peculiar to basic research can be protected, where the

funding can be sufficiently stable for sound planning and operation, and where close liaison with the military can still be maintained. Laboratories like the National Bureau of Standards and the United States Naval Research Laboratory have the breadth and depth of competence and activity to provide the leadership required were they properly placed organizationally. But NRL unfortunately is buried at the very bottom of the administrative heap in the Navy's Office of Naval Research.

NRL has made a continuing effort to keep the costs of its rocket sounding program down. One approach which promises to reduce costs by large factors is the development of the Arcon and Iris rockets. Lacking Navy support for these developments, NRL found a non-DOD sponsor who agreed to fund the developments to their conclusion. Some funds were transferred to NRL, but at this juncture DOD and the Bureau of the Budget told the sponsor to leave the rocket development business to DOD. But DOD did not provide the funds needed, and the Arcon and Iris efforts ground to a halt. Arcon would have died had not the Navy learned that the Army was going to pick up the work, whereupon the necessary funds suddenly became available. Iris did come to a complete halt, and would have died had not NRL with great difficulty made available enough funds to get it moving again. More funds will be needed to exploit Iris potentialities to their fullest, but where the monies will come from is not known. It should be pointed out that the Arcon and Iris not only will be much cheaper than previously used sounding rockets of comparable performance, but also are genuine technological breakthroughs in the solid propellant rocket field. In spite of this they must struggle for their very existence.

(b) *Lack of money.*—The rocket upper atmosphere research program was a necessary prelude to satellite research. At the present time vertical rocket sounding and satellite research are complementary methods of doing space research, the former must be used for studying the atmosphere along a vertical cross section, while the satellites provide platforms for making measurements at fixed levels above the atmosphere.

The upper air rocket research program at NRL has always received strong support from the Laboratory administration. The cost of the program, however, is about twice that of a normal laboratory research program, because of the need for rockets, launchers, telemetering ground stations, special airborne equipments, and expeditions to remote locations such as the Arctic, the Antarctic, and the mid-Pacific. The cost is about \$45,000 per man per year as opposed to about \$25,000 per man per year for normal research. As a result a large fraction of the rocket sounding program has never been covered in NRL's annual budgets. To do so would have required sizeable reductions in the Laboratory's staff, which in turn would have destroyed the breadth of competence which is the Laboratory's great strength. Instead, rockets, telemeters, ground stations, etc., have been purchased out of whatever balances happened to be left toward the end of each fiscal year. Appeals to the Navy for relief from this situation have been of no avail. This hazardous fiscal policy forced upon the Laboratory has prevented sound planning for and execution of the program. What has been done has been accomplished in spite of these blocks.

Because of the fiscal policy that lack of higher level support forced upon NRL in connection with its rocket sounding program, this program was about to go under several years ago, in spite of the fact that its accomplishments had shown the NRL program to be the most comprehensive and productive such effort in the country. The program would have gone under at that time had not the International Geophysical Year rescued it. At the present time this program continues because of IGY rockets and equipment bought by the National Science Foundation. No funds are available, however, to purchase more rockets and equipment for continuing this research beyond IGY, even though there will remain many important problems to solve. To maintain continuity in the program, these new rockets must be ordered now so as to be available at the end of the current IGY effort.

The personnel in this program are highly competent scientists, and are constantly besieged with offers of jobs in industry and elsewhere. Salary increases between 30 percent and 50 percent are quite common. These men stay with the project, however, because of scientific interests, because of its dynamic and challenging nature, and because they believe they are doing something important while the proffered jobs usually would take them out of the basic research field entirely. The present lack of monetary support for the program, however, has become obvious to all and is a source of concern. Many of the men, including top level key personnel, are now looking about to decide where they should jump

when the program goes under, if it does. Time is of the essence if the program and the staff to do it are to be saved.

(c) *Lack of personnel.*—The NRL rocket sounding program started with enough people to conduct a comprehensive program that covered most of the important research problems in the field. In the case of upper air research this is essential because the various phenomena involved—pressures, temperatures, densities, winds, ionosphere, magnetic fields, the aurora, airglow, cosmic rays, the solar radiation input, and meteors—are all so interrelated that an understanding of one aspect requires knowledge of all the other aspects. For the past 5 years, however, the rocket upper air program has operated at or below half the necessary strength to do the job right. Besides the obvious effect of lowering the total effectiveness of the program, this understaffing imposes extra burdens and strains on the personnel who are available since they naturally extend themselves in a commendable but impossible effort to make up for the deficiency in manpower.

Question 4

This country's position in the field of space research would be greatly strengthened by the creation of a National Space Establishment, as recommended in a document entitled "A National Mission to Explore Outer Space." With the support of the National Academy of Sciences, this document has been presented to Dr. Killian as a recommendation of the Rocket and Satellite Research Panel.

Some of the things that such a National Space Establishment should do are:

SPACE EXPLORATION

Vehicles
Electronics systems
Communications
Tracking
Guidance
Control
Power
Logistics
Operations
Astronautics
Medicine
Law
Applications

SPACE RESEARCH

Vehicles
Electronics systems
Logistics
Operations
Earth's atmosphere
Moon
Interplanetary phenomena
Sun
Planets
Stars
Interstellar phenomena
Extragalactic observations
Applications

One of the first things that should be done is to strengthen the present rocket sounding program, and to put it on a sound basis financially.

It is my feeling that something similar to what the Rocket and Satellite Panel has recommended for space research would be very effective in the missile research and development field also.

I should like to conclude with a few general remarks. First about salaries. I believe that a raise in salaries for scientists is necessary, but I do not believe that the Government has to match the salaries of industry. The Government can retain competent, top quality scientists by providing (a) the opportunity to do research and engineering in dynamic, pioneering programs that are adequately supported, and (b) an adequate salary for the scientist to live in reasonable comfort and to provide his children with a good education.

Secondly, Government facilities can provide research opportunities that private enterprise cannot fit into a reasonable profit-and-loss scheme of things. Because of this and because of research freedoms that the Government can afford, the Government can get research men at lower salaries than industry, and thus can do research at a lower overall cost. On the other hand, nothing is gained if the costs are reduced to the point where the Government cannot attract and retain the top level of competence.

Finally, it is my opinion that the military have strayed too far from their primary job of defense in which they are a user of research and research products, and are attempting to prescribe the research that is to be done and even to direct the research itself. On both counts the military are incompetent to do the job. The Office of Naval Research and especially the Naval Research Laboratory have traditionally had less military interference of this type than other defense establishments with which I am familiar. The high productivity of NRL, which includes many important military applications, is strong justification for civilian scientific direction of science programs free of military interference. Let me

hasten to add, however, that it is recognized that there must be close liaison and cooperation between the scientists and the military.

Sincerely yours,

HOMER E. NEWELL, JR.

Mr. WEISL. In our letter to him we asked for the bottlenecks that impede his program. His reply is dated only the 9th of December this year.

He says:

The bottlenecks that I have encountered have been of three types: (a) administrative; (b) lack of money; and (c) lack of personnel.

And, as an illustration of the administrative lack, he quotes, that is, I quote:

The Viking, which was begun in 1946 and was developed as an upper-air research vehicle, the rocket itself, the techniques learned and the associated equipment developed, form the nucleus for further development into a ballistic system. Nevertheless, the Naval Research Laboratory could never obtain the financial support to carry out this development.

In 1952, the Laboratory pointed out to the Navy the importance of a ballistic weapon to military preparedness, and showed in detail how the Viking experience and hardware could be used as the basis for development of the medium-range ballistic missile, usable from land, ship, or submarine. But such a project was never funded.

But when the ballistic-missiles proposals failed to receive support, Naval Research Laboratory decided to use the Viking as a supporting research vehicle to obtain data important to missile development.

Because of its cost it was difficult for Naval Research Laboratory to fund this project, and since appeals to both the Navy and the Air Force brought no support, the project was about to go under when the Vanguard program came along.

Are you familiar with that situation?

Mr. HOLADAY. I am partially familiar with it. This is well before my time, as you well realize.

Mr. WEISL. According to this letter, it still exists. He goes on to state:

Basic research in the Department of Defense suffers by being swallowed up in and made subservient to applied research-and-development programs. It suffers in competing with such programs for money, for personnel, facilities, and support in general.

What is needed is a permanent, competent, and adequate staff of scientists at the Department of Defense level to provide some leadership in basic and applied research. By "leadership" I do not mean detailed direction. I mean the actual doing of high-quality, imaginative, comprehensive, and dynamic research, the participation in scientific pioneering.

Mr. HOLADAY. I believe, sir, that the announcement which Secretary McElroy discussed with you, of setting up this department within the Department of Defense on space and satellite work, was a direct answer to his recommendation.

COMPARATIVE PRIORITIES OF BALLISTICS AND SPACE-SATELLITE WORK

Mr. WEISL. Didn't you say in your public statement that space-satellite work should be second to, should wait until the ballistic missiles are developed and operational, and it was like locking the front door and keeping the back door open?

Mr. HOLADAY. I said that ballistic missiles, in my opinion, should get the most money and the most effort at the present time, that we can currently carry along a balanced space and satellite program.

Mr. WEISL. Did I misquote the statement?

Mr. HOLADAY. No, sir

Mr. WEISL. Now, in this same letter, Mr. Holaday, the gentleman from the Naval Research Laboratory states:

Finally, it is my opinion that the military have strayed too far from their primary job of defense in which they are a user of research and research products, and are attempting to prescribe the research that is to be done, and even to direct the research itself. On both counts, the military are incompetent to do the job.

The Office of Naval Research, and especially the Naval Research Laboratory, have traditionally had less military interference of this type than other defense establishments with which I am familiar.

Do you agree with that statement?

Mr. HOLADAY. Partially, Mr. Counsel. I do think that for the record at this time, and we must realize that the National Science Foundation has a responsibility for basic research, this might be a fair time to indicate the increased amount of money that has gone into these programs.

I am not now talking about definitely research and development, but the rate at which we have accelerated our expenditure of money in the missile program.

CITES FAILURE TO EMPLOY JUPITER-C FOR SATELLITE

Mr. WEISL. Well, he goes beyond money. He says the whole thing lacks imagination, leadership, competence, and direction.

Now, Mr. Holaday, we have here a letter from the head of the physics department of the University of Iowa, who for 12 years has been actively engaged in the field of missiles and rockets for high-altitude research. Here is his statement:

I believe that there is adequate scientific, engineering, and technical manpower in the United States missile and satellite field, there now exists a vast technology in the United States which can be applied to agreed national objectives.

However, the administrative handling of this potential has been painfully divisive and painfully lacking in clear, unified objectives. The very roster of missiles under development by the several services is prima facie evidence for the diffuseness of national effort and for the lack of concentration of this effort on primary needs.

In the satellite field it would have been technically feasible for the United States to place satellites in orbit at least as early as October 1956, using the Army's Jupiter-C. But the Army's proposal to do this was vetoed down within the Defense Department in the summer of 1955 in favor of having the Navy undertake the development of a complex new vehicle for that purpose.

This decision, which has been actively contested by some of us throughout the past 2 or 3 years, was defended in terms of not interfering with direct military developments. However, the true overall effect has been exactly the reverse, since a fresh set of difficult missile developments was imposed on commercial contractors, Glenn L. Martin Co., Aerojet Engineering Corp., General Central Rocket Committee—

and so forth,

who were already deeply involved in the development of purely military vehicles.

The proposed Jupiter-C system was to be assembled of rockets and other components already in existence in 1955. This system was convincingly demonstrated to be capable of placing a 15-pound payload in a satellite orbit as early as September 1956.

Even after this famous flight, the issue was treated by the Defense Department as too delicate to mention lest the precarious balance of interservice rivalry be disturbed.

I regard the Navy's Vanguard program as in competent hands, despite vastly overpublicized difficulty, such difficulties being actually normal in this difficult field. But I regard the Department of Defense's decision to proceed with the Vanguard development as thoroughly ill-advised.

That is signed by Prof. J. A. Van Allen, head of the department of physics of the University of Iowa, who for 12 years has been specializing in the field of high-altitude research.

(The letter referred to reads in full as follows:)

STATE UNIVERSITY OF IOWA,
DEPARTMENT OF PHYSICS,
Iowa City, December 9, 1957.

MR. EDWIN L. WEISL,
*Senate Preparedness Investigating Subcommittee,
Committee on Armed Services, Senate Office Building, Washington, D. C.*

DEAR MR. WEISL: This letter is in reply to yours of the 3d instant. By way of introduction, I may remark that my own special knowledge and experience in the missile and satellite field relate to the use of high-altitude rockets and satellites for scientific purposes, rather than for direct military applications. I have been actively engaged in this field for nearly 12 years, and am at present deeply involved in the national program of using rockets and satellites in the United States portion of the International Geophysical Year undertaking.

My responses to your questions are numbered to correspond to the numbered paragraphs of your inquiry.

1. I believe that there is adequate scientific, engineering and technical manpower in the United States missile and satellite field. There now exists a vast technology in the United States which can be applied to agreed national objectives. However, the administrative handling of this potential has been painfully divisive and painfully lacking in clear, unified objectives. The very roster of missiles under development by the several services is prima facie evidence for the diffuseness of national effort and for the lack of concentration of this effort on primary needs.

2. In the satellite field, it would have been technically feasible for the United States to place satellites in orbit at least as early as October 1956 using the Army's Jupiter-C. But the Army's proposal to do this was voted down within the Defense Department (in summer 1955) in favor of having the Navy undertake the development of a complex, new vehicle for the purpose. This decision, which has been actively contested by some of us throughout the past 2 or 3 years, was defended in terms of not interfering with direct military developments. However, the true overall effect has been exactly the reverse—since a fresh set of difficult missile developments was imposed on commercial contractors (Glenn L. Martin Co., Aerojet Engineering Corp., Grand Central Rocket Co., etc.) who were already deeply involved in the development of purely military vehicles. The proposed Jupiter-C system was to be assembled of rockets and other components already in existence in 1955. This system was convincingly demonstrated to be capable of placing a 15-pound payload in a satellite orbit as early as September 1956. Even after this famous flight the issue was treated by the Defense Department as too delicate to mention, lest the precarious balance of interservice rivalry be disturbed.

I regard the Navy's Vanguard program as in competent hands (despite vastly overpublicized difficulties, such difficulties being actually normal in this difficult field). But I regard the DOD's decision to proceed with the Vanguard development as thoroughly ill advised.

3. [Blank.]

4. The United States has an urgent need for the genuine unification of its missile and satellite efforts in a civilian commission having the general character of the Atomic Energy Commission. The essential features of such a Missile and Satellite Commission are as follows, in my judgment:

(a) It should have a statutory status independent of the Department of Defense.

(b) The military services should be regarded as customers (as with the AEC) but they should not possess direct control over its program, nor should their customer demands preclude a vigorous program on longer term scientific and civilian applications.

(c) It should have adequate funds provided by specific congressional action.

(d) It should operate, by contract, one or more centralized laboratories, necessary proving grounds, and other major facilities required.

(e) It should have, via the President, adequate means for requisitioning the services of military bases, ships, personnel, equipment, etc., as required.

(f) It should give such a level of support to the scientific and civilian applications of missiles and satellites as seems appropriate to the long-term national welfare. Much of this support would likely take the form of contracts to universities and to other civilian research establishments. Only in this way can

the scientific resources of the country be developed in an imaginative and profitable way for the long-term exploitation of the vital new field of exploring space and using the results and the techniques for human benefit. (The military applications, though of most immediate importance, are quite narrow and limited. Note the similarity to the work of the Atomic Energy Commission.)

I hope that these remarks may be of some value in your investigation. I may emphasize again the similarity of the national need to that which led to the establishment of the Atomic Energy Commission. The eminent success of AEC in supplying all military needs, in developing civilian applications of atomic energy, and in forwarding fundamental scientific research and education in the sciences is well known.

I believe that the Congress and the President are presented with a similar opportunity in the missile and satellite field.

Sincerely yours,

J. A. VAN ALLEN,
Head, Department of Physics.

Mr. WEISL. Do you agree with the professor?

Mr. HOLADAY. You will realize this happened before my time. But I think it should be made clear that in selecting the Vanguard project we also used some very capable scientists to advise these programs. I believe this was pointed out by Secretary Quarles.

Mr. WEISL. I know you were not in the Department in 1956, but do you agree with the professor's conclusions?

Mr. HOLADAY. As to the fact when you say—

Mr. WEISL. That it was a mistake not to let Jupiter-C launch a satellite in 1956 ahead of the Russians?

Mr. HOLADAY. Sir, in retrospect, what—

Senator JOHNSON. Would the witness answer counsel's question, please?

Mr. WEISL. You say in retrospect you do agree?

Mr. HOLADAY. If you look back now on the success of the Jupiter-C development, we would say yes, we made a mistake, or whoever made the decision, it was a mistake to have selected the Vanguard approach because the Jupiter-C has turned out to be more successful.

Mr. WEISL. Do you agree with the professor's conclusion that it really did not save anything for the military because they reimposed on Glenn Martin and Aerojet and the other rocket companies who were already involved in military work this extra burden of producing a new type revolutionary engine for the Vanguard satellite?

Mr. HOLADAY. Sir, if you had used Jupiter-C, you would have also used people directly connected with military work.

Mr. WEISL. Is it not true that in 1955 Dr. Killian, whom you have quoted, stated it was of utmost importance, psychologically and otherwise, to get a satellite in orbit before the Russians? Did he not make that statement to the Department of Defense?

Mr. HOLADAY. It is indicated in the report, I am pretty sure, I believe I have read it.

Mr. WEISL. So that it was not a question of hindsight?

Senator JOHNSON. The date of that report was 1955?

Mr. HOLADAY. I believe that is the Killian report; 1955. I do not remember the date.

Mr. WEISL. September 1955.

Senator JOHNSON. Is that correct, that in September 1955, Dr. Killian made his report and that in that report he made his recommendation? Counsel and witness agree?

Senator SYMINGTON. Mr. Chairman?

Senator JOHNSON. Senator Symington.

Senator SYMINGTON. Mr. Chairman, may I suggest, based on the letters I have read in detail from the United States Naval Research Laboratory and the questioning of able counsel as against that letter signed by Mr. Homer E. Newell, Jr., I would like to respectfully suggest to the Chair and the committee that Mr. Newell be called as a witness before this committee.

Senator JOHNSON. The chairman and staff will give consideration to that suggestion and notify members of the committee at the earliest opportunity.

Proceed, counsel.

Mr. WEISL. Are you familiar with the Ramo-Wooldridge Corp.?

Mr. HOLADAY. Yes, sir.

Mr. WEISL. Are they the principal consultants, research and scientific consultants, to the United States Air Force?

Mr. HOLADAY. That is correct.

Mr. WEISL. In the ballistic-missile field?

Mr. HOLADAY. Yes, sir.

Mr. WEISL. And they still continue to be the principal scientific and technological consultants to the United States Air Force?

Mr. HOLADAY. Yes, sir.

Mr. WEISL. I have here a letter dated December 10, 1957, from Mr. Simon Ramo.

(The letter referred to is as follows:)

THE RAMO-WOOLDRIDGE CORP.,
Los Angeles, Calif., December 10, 1957.

Mr. EDWIN L. WEISL,
Special Counsel, Preparedness Investigating Subcommittee,
Committee on Armed Services, United States Senate,
Washington, D. C.

DEAR MR. WEISL: I have just returned to my office after attending meetings out of the city for several days, and have found your letter of December 3, requesting a statement.

The attached memorandum has been prepared in response to this request. I hope that it has reached you early enough and includes such material as will prove helpful to you and your staff.

Sincerely yours,

SIMON RAMO.

MEMORANDUM IN RESPONSE TO REQUEST OF THE SPECIAL COUNSEL TO THE
SENATE PREPAREDNESS INVESTIGATING SUBCOMMITTEE

The following are answers to the specific numbered questions contained in the request of December 3, 1957.

1. The missile and satellite programs of the Nation have not used the scientific and engineering manpower of the Nation to the fullest. Although this maximum has been approached in the case of the Air Force's Thor, Atlas, and Titan programs, two other factors have existed on all programs, including the above-referenced Air Force programs, that have limited the program prior to the exhausting of the full scientific manpower resources of the Nation. These are (a) fund and facility limitations; and (b) the use of top scientific and engineering-management manpower to "sell," justify, defend, and otherwise be involved in nontechnical aspects to insure full appreciation, maximum sponsorship, and continuation of the programs. Ultimately, the technical resources of the Nation will limit our rate of progress in these and related fields, but today the much discussed shortage of engineers and scientists has not been the bottleneck.

2. In research and development work generally, the bottlenecks have been (a) too small a budget; (b) insufficient appreciation of the importance of research and development work planned and carried on well ahead of the commitment to a major weapons system; (c) well-entrenched bad habits to regard research and development as deserving only of minor sponsorship until and unless there is

fairly complete evidence that a major new weapons system based on this research and development will, indeed, be successful; and (d) the tendency to implement research and development out of procurement funds. As a general comment, it can be said that too large a fraction of the top research and development talent of the Nation is engaged in nontechnical pursuits intended to assure the stability of the teams with which these topmen are associated.

3. The chief factor in determining where we stand in missiles and satellites today is the late starting date—late compared with when these programs could have been started. This late start resulted from years of established practices to mull over, argue out (often in an atmosphere of interservice rivalry), analyse, and committee-to-death the starting of any major project. We have had this dilemma: Our pattern of operations has precluded committing to large projects early, when the job appears too speculative as to its final results; yet we have not permitted large basic research and development expenditures that in the end constitute the only means for uncovering evidence as to the potential success of new concepts. It is a small exaggeration to state that the starting of our huge ICBM and IRBM programs resulted when they did, rather than a year or two later, only due to the accidental timely appearance in the right places of certain personalities of exceptional conviction, imagination, and courage.

4. The completion of the development, production engineering, and production, and the attainment of operational capability in the existing long-range ballistic missiles can best be assured by every possible support for the competent operating organizations already built up to handle these projects. It is too late now, and dangerous in the sense of potential dislocations and schedule slippages, to attempt a complete governmental reorganization for these specific projects that are now so well along. There is no way now to go back and start over again at an earlier date. However, with regard to all follow-on projects, including improved ballistic missiles and a variety of satellites and other space weapons systems, we will progress at a faster rate only if (a) very major changes are made in Defense Department organization to eliminate interservice rivalry handicaps; (b) separate funding is provided for these major programs; (c) new procurement and research and development policies are instituted that will permit large gambles; and (d) in the long run, relatively huge expenditures are committed, compared with our present trivial ones for basic research (not tied to any specific military weapons system idea) and education. In connection with the presently existing ballistic-missile projects that are nearing completion dates in the next year or two, a 10- or 20-percent increase in funds and a smoothing out of all organizational problems above the level of the operating organizations will be sufficient to provide the maximum of support. In the case of follow-on projects, a doubling of expenditures is required, and, in the case of basic research and education, some tenfold increase is what is needed to maintain or insure superiority in our position with respect to the Soviet.

Mr. WEISL. In replying to the question, "Are there any bottlenecks?" he states, and I quote:

In research and development work generally, the bottlenecks have been (a) too small a budget; (b) insufficient appreciation of the importance of research and development work, planned and carried on well ahead of the commitment to a major weapons system; (c) well-entrenched bad habits to regard research and development as deserving only minor sponsorship until and unless there is a fairly complete evidence that a major new weapons system based on this research and development will, indeed, be successful; and (d) the tendency to implement research and development out of procurement funds.

As a general comment, it can be said that too large a fraction of the top research and development talent of the Nation is engaged in nontechnical pursuits intended to assure the stability of the teams with which these teams are associated.

Do you agree with that conclusion of Dr. Ramo?

Mr. HOLADAY. Yes, sir.

Mr. WEISL. Are you doing anything about it?

Mr. HOLADAY. Yes, sir.

Mr. WEISL. What are you doing about it?

Mr. HOLADAY. In the broadest terms, this is a part of the record which I have been asked to put in here. I have always been a very strong supporter of research and development. This will show up,

I believe, in some of the material which I am going to be able to put into the records of the work of using our advisory committees for recommending increased amounts of money for research and development.

I am talking here now about the same thing that I think Si Ramo is talking about.

Mr. WEISL. He does not speak only of money. He speaks of insufficient appreciation of the importance of research and development, and too large a fraction of the top research and development talent of the Nation engaging in nontechnical pursuits.

Mr. HOLADAY. I agree with this—correct.

Senator JOHNSON. Will counsel give Dr. Ramo's title again, and his present capacity.

RAMO DETAILS FACTORS THAT SLOWED US DOWN

Mr. WEISL. He is president of the Ramo-Wooldridge Corp., chief research and scientific consultants to the Air Force.

Senator SALTONSTALL. What is that name?

Mr. WEISL. Ramo, Ramo-Wooldridge Corp.

Senator JOHNSON. If the chief consultant to the Air Force feels that way about it, and the Director of the missiles program feels that way about it, who is it that does not feel that way about it, and why do we not get going on missiles? Who is doing this stopping?

In other words, you agree with everything he says and what he says is a severe indictment.

Mr. WEISL. He says some more things here, Mr. Chairman.

Senator JOHNSON. Then I will withhold.

Mr. WEISL. He says also:

The chief factor today in determining where we stand in missiles and satellites is the late starting date, late compared with when these programs could have been started. This late start resulted from years of established practices to mull over, argue out in an atmosphere of interservice rivalry, analyze and committee to death the starting of any major project. We have had this dilemma.

Our pattern of operation has precluded committing too large a project early when the job appears too speculative as to its final result. Yet we have not permitted large basic research and development expenditures that in the end constitute the only means for uncovering evidence as to the potential success of new concepts. It is a small exaggeration to state that the starting date of our huge ICBM and IRBM programs resulted when they did rather than a year or two later only due to the accidental timely appearance in the right places of certain personalities of exceptional conviction, imagination, and courage.

Do you agree with that?

Mr. HOLADAY. That gentleman, I believe, has reference to the recommendation from a Scientific Advisory Committee which is still advising me at the present time, which made the recommendation to proceed with the development of the IRBM and the ICBM. We still have most of those fellows, except one gentleman who died, still as members of our advisory committees.

Mr. WEISL. But he speaks of committee-ing these things to death. You still have all these committees and all these men on these committees through whom all these projects have to be cleared before you get going, do you not?

Mr. HOLADAY. No, sir.

Mr. WEISL. What do you have the committees for?

Mr. HOLADAY. For advice, as pointed out by Si Ramo. These are to keep us advised as to the technical possibilities of breakthrough.

This is our Technical Advisory Committee. The one which we have on special capabilities is a group of very great competence which advises also on possibilities of satellite work. The one ballistic missile committee is probably wrongly classified.

This is an in-house operating unit. This is where the action is taken.

Mr. WEISL. I have a letter from the Bell Telephone Laboratories, with which Secretary Quarles was connected for many years before he became the Deputy Secretary of Defense. Let me read what they say. This letter is dated December 9, 1957.

Senator JOHNSON. Counsel, could I interrupt?

Mr. WEISL. Yes, sir.

Senator JOHNSON. Without objection, I should like to have these complete letters incorporated in the record—Mr. Silverstein's complete letter and the text of Mr. Ramo's letter, and any other letters that you may read from—I should like to have them in the record so that they will be available to members of the committee and others who may be interested in seeing them.

(The Bell Telephone Laboratories letter referred to is as follows:)

BELL TELEPHONE LABORATORIES, INC.,
Whippany, N. J., December 9, 1957.

Mr. EDWIN L. WEISL,
*Special Counsel, Senate Preparedness Investigating Subcommittee,
United States Senate, Committee on Armed Services,
Washington, D. C.*

DEAR MR. WEISL: This is in reply to your letter of December 4, 1957, requesting information and comment in connection with our participation in the Nation's missile programs. Mr. S. C. Donnelly, assistant works manager of the Western Electric Co. at Burlington, N. C., has received a similar letter. Since the Bell Telephone Laboratories conducts research and development work for the Government as an agent of the Western Electric Co., and Western is both the prime contractor to the Government and the manufacturer of the Bell Laboratories' designs, Mr. Donnelly and I thought it would be helpful to your committee if we prepared this joint reply covering both the research and development and production aspects of our missile programs.

The laboratories and Western first participated in missile work by providing radar homing guidance equipment for the Navy Bat missile during World War II. We assume that this activity took place before the period of current interest to your committee, and have therefore confined this reply to the projects we have been engaged in since that time. These more recent projects are of two types, one being the series of Nike developments for the Army in which we have been responsible for the entire guided-missile weapon system, and the other being projects for the Navy and Air Force in which we have been responsible for only the guidance equipment as distinguished from the weapon system as a whole.

On the Nike projects we have been associated with the Douglas Aircraft Co. as our major subcontractor to whom we have delegated, in general, the responsibility for research, development, and production on the missile itself, together with its associated launching, handling and checkout facilities. In this capacity Douglas has carried out about one-half of the total effort on the Nike projects in both research and development and production. This reply has been coordinated with Douglas to the very limited extent consistent with prompt reply in an effort to provide a more complete picture insofar as the Nike projects are concerned. On the other projects our responsibility is limited to guidance equipment and our comments are restricted thereto.

Certain of the questions in your letter regarding schedules and quantities would require classified information for a complete reply. With the thought that this letter may be more useful to your committee if it is unclassified, we have omitted these numbers. They are, of course, available from the respective services involved.

Attached are separate documents on each of our projects which we hope will answer the questions in sections I and II of your letter. The answers are indexed in the same manner as your questions. Our response to your request for recommendations in section III of your letter is given in the following paragraphs.

III. RECOMMENDATIONS

1. There is need for more concentration of responsibility and authority.

More concentration would reverse the present trend toward increasing numbers of people in Government who must be informed before decisions can be reached. This applies to both project work and associated facilities. Once it is decided to proceed with a particular project, a single individual backed by a competent organization should have the responsibility and authority to carry out the development and production of the weapon system as a whole. His responsibility should carry through until the weapon system is in effective operational use. A situation approaching this obtained in the early days of Nike.

2. Use of overtime should be at contractor's discretion.

While recent restriction of overtime has not yet seriously affected our projects, it would seem wise for the future to allow contractors to use overtime as required to meet their obligations.

3. Longer term authorizations would be desirable.

Longer term funding would in many instances permit more expeditious and efficient management.

4. Reduction in the amount of required paperwork would speed progress.

The last attachment to this letter comprises a copy of a directive we have received since October 4, 1957, as requested in your supplementary letter dated December 5, 1957.

We sincerely hope that the information furnished with this letter will be helpful to your committee.

Very truly yours,

W. C. TINUS,
Vice President,
Bell Telephone Laboratories, Inc.

Attest:

S. C. DONNELLY,
Assistant Works Manager,
Western Electric Co., Inc.

Attachments:

1. Nike Ajax.
2. Nike Hercules.
3. Nike Zeus.
4. Titan.
5. Thor.
6. Terrier (MSG-3).
7. Terrier (MSG-3A).
8. Directive.

NIKE AJAX

I. Research and development

A. *Start of research and development.*—Study started October 1944 (sponsored by Army Ordnance Corps and Army Air Force). Contract for exploratory development to prove feasibility July 1945 (sponsored by Army Ordnance). Authorized to proceed with production design for tactical use July 18, 1950.

B. *Status of research and development.*—Completed in 1953 except for product improvement based upon field experience.

C. *Overtime limitations.*—None.

D. *Adequacy of funds.*—Development progress was slowed by limited funding in the 1948-50 period.

E. *Adequacy of manpower.*—Adequate manpower was made available by delaying less urgent work.

F. *Effect of change orders.*—No changes were requested by the Army which had any important effect on the schedule.

G. *Bottlenecks.*—No insurmountable bottlenecks were encountered on this project.

II. Production

A. Letter of intent, February 19, 1951; definitive contract, March 18, 1952. Three prototype ground systems were delivered in 1952. Regular production deliveries of ground system began February 1953. Delivery of production missiles began June 1952.

B. *Production schedules.*—Original schedule called for three prototype ground equipments in 1952 and first production ground equipment deliveries beginning in February 1953. These schedules were met. The original schedule also called for delivery of production missiles beginning in 1952. Less than the scheduled quantity of missiles were delivered in 1952 for the reason given below.

C. *Factors limiting production.*—Production of missiles in the first year was held below scheduled rate due to difficulty in procuring critical instrument items of adequate quality. Production of ground equipments to meet all present Army needs was completed on schedule in September 1957. Missile production to meet Army needs is continuing.

D. *Overtime limitations.*—No overtime limitations affecting schedules in any important respect have been applied.

E. *Adequacy of funds.*—The overall production program has not been seriously hampered by lack of funds, although difficulties have been involved in maintaining production without hiatus on account of late receipt of reorders.

F. *Adequacy of manpower.*—No serious manpower problems.

G. *Effect of change orders.*—No delays due to changes requested by Army.

NIKE HERCULES

I. Research and development

A. *Start of research and development.*—Authorization for study, May 1952; authorization for research and development, June 1953.

B. *Status of research and development.*—Completed 1957 except for product improvement based upon field experience. Development of a more advanced version is also under way.

C. *Overtime restrictions.*—None.

D. *Adequacy of funds.*—Short-term piecemeal funding has been cause for concern but has not yet seriously hampered progress.

E. *Adequacy of manpower.*—No serious problem to date.

F. *Effect of change orders.*—No changes were requested by the Army which had any important effect on progress.

G. *Bottlenecks.*—No insurmountable bottlenecks have been encountered.

II. Production

A1. Contract for prototypes April 29, 1955.

B1. Prototype ground guidance systems were delivered as scheduled in early 1957. Prototype missile deliveries started in 1956 and have kept pace with test needs.

A2. Contract for production missiles April 29, 1955; contract for production ground guidance systems November 30, 1955.

B2. Delivery of production ground guidance systems began in June 1957 and are on schedule.

C. No major factors are limiting production of ground guidance systems.

D. The Department of Defense overtime limitation has been applied but has not caused a change in schedules.

E. Production has not been hampered by lack of funds.

F. Production has not been hampered by lack of manpower.

G. Production has not been delayed by changes requested by the Army.

NIKE ZEUS

I. Research and development

A. *Start of research and development.*—Original study work done on Hercules (attachment 2). Authorization for research and development, April 1955.

B. *Status of research and development.*—Basic development on both the high-power radars required and on the high-performance missile is proceeding. Rapid progress is being made on the most difficult technical problems requiring solution for an effective antiballistic missile system. Full-scale models of the missile motor with the required high performance have been ground tested. Scale models of the advanced radar antennas have been tested and the first high power transmitters are under construction.

C. *Overtime restrictions.*—None.

D. *Adequacy of funds.*—Available fiscal 1957 funds were inadequate for an accelerated program. Fiscal 1958 funds are almost adequate for optimum progress.

E. *Adequacy of manpower.*—No serious problem to date.

F. *Effect of change orders.*—No changes have been requested by the Army which had any important effect on progress.

G. *Bottlenecks.*—No bottlenecks other than those inherent in the difficult technical problems to be solved are currently delaying the program.

II. Production

No decisions have yet been made on the plan for accelerated production.

TITAN

(Weapon system 107A-2)

The participation of Western Electric Co., Inc., and Bell Telephone Laboratories, Inc., on the Titan missile project is directed toward research, development, and prototype production of radio-inertial guidance system and related ground support equipment. The work is carried out in close collaboration with the Glenn L. Martin Co. (missile contractor), Remington Rand-Univac (computer contractor) and under the technical direction of Ramo-Wooldridge Corp.

I. Research and development

A. *Start of research and development.*—Formal authorization and project initiation, letter contract dated October 18, 1955. Prior applicable work: Collaboration with Douglas Aircraft Co. on study of intermediate range ballistic missile project MX-2039 beginning June 1954. Project was withdrawn by Air Force in favor of intercontinental ballistic missile but study was completed without Air Force support and the work is largely applicable to the Titan guidance problem.

The Titan radio-inertial guidance system draws heavily on radar equipment designed for Nike Hercules.

B. *Status of research and development.*—On schedule and compatible with progress of subsystems supplied by other contractors in the program.

C. *Overtime restrictions.*—Letter dated June 17, 1957, from Air Force Ballistic Missile Office to Western Electric Co. requested 40 percent reduction in currently applied overtime with proviso that there must be no delay in schedules. This reduced the then current overtime of 12 percent to a ceiling of 8 percent, beyond which approval would be required from AFBMO.

Teletype message dated September 17, 1957, from AFBMO to Administrative Contracting Officer, New York Air Procurement District. This further limited overtime on work not in direct support of static or flight test programs to a maximum of 3 percent. On static and flight test programs the previous 8 percent ceiling remained in effect.

No further changes have been made by the Air Force in overtime requirements. However, our progress has not been hampered by these restrictions to date.

D. *Adequacy of funds.*—Progress has not been hampered by lack of funds to date.

E. *Adequacy of manpower.*—Progress has not been hampered by lack of sufficient manpower.

F. *Effect of change orders.*—No effect to date.

G. *Bottlenecks.*—No insurmountable bottlenecks have developed to date.

II. Production

A. Letter contract dated October 18, 1955; definitive contract dated October 4, 1957. These documents call for research and development together with a specified quantity of ground guidance and missile-borne guidance equipment prototype models. No production equipment beyond the prototype models has been authorized to date. Model construction (substantially of production design and produced by the Western Electric production organization) is proceeding concurrently with research and development.

B. *Status of model construction.*—Substantially in accordance with original schedule and consistent with other phases of the project.

C. *Factors limiting production.*—No abnormal factors.

D. *Overtime limitations.*—See item I-C above.

E. *Adequacy of funds.*—No problem to date.

F. *Adequacy of manpower.*—No problem to date.

G. *Effect of change orders.*—No delays.

THOR

(Weapon system 315A)

The participation of Western Electric Co., Inc., and Bell Telephone Laboratories, Inc., on the Thor missile program was directed toward research, development and prototype production of radio-inertial guidance systems and related ground support equipment. The work was carried out in close collaboration with Douglas Aircraft Co. (missile contractor), Remington Rand-Univac (computer contractor), and under the technical direction of Ramo-Wooldridge Corp.

The radio-inertial guidance system was considered by the Air Force as a backup system for an all inertial guidance system under development by another contrac-

tor. The guidance system proposed for Thor was very similar to that being developed for Titan.

I. Research and development

A. *Start of research and development.*—Formal authorization and project initiation, amendment No. 3 dated February 9, 1956, to letter contract covering our work on the Titan guidance system. (See attachment 4.) Prior applicable work, see item I-A, attachment 4—Titan.

B. *Status of research and development.*—On schedule at the time of Air Force decision to discontinue radio-inertial guidance system for Thor August 16, 1957.

C. *Overtime restrictions.*—Same as on Titan (attachment 4) prior to discontinuance of our part in the Thor program.

D. *Adequacy of funds.*—Program was not hampered by lack of funds during its existence.

E. *Adequacy of manpower.*—Sufficient.

F. *Effect of change orders.*—As noted under item I-B above, the participation of Western Electric and Bell Telephone Laboratories in the Thor program was discontinued August 16, 1957.

G. *Bottlenecks.*—No insurmountable bottlenecks prior to discontinuance of our part in the program.

II. Production

Not applicable, see above.

TERRIER GUIDED MISSILE CONTROL AND GUIDANCE EQUIPMENT AN/MSG-3

Western Electric Co. was the prime contractor for control and guidance equipment only. Terrier missiles were supplied to the Navy by another contractor.

I. Research and development

A. *Start research and development.*—Research and development and design work started under letter of intent dated July 1951.

B. *Status of research and development.*—Work completed.

C. *Overtime limitations.*—None.

D. *Adequacy of funds.*—No delays for funding.

E. *Adequacy of manpower.*—Not hampered by lack of manpower.

F. *Effect of change orders.*—No changes requested by Navy that had any important effect on schedule.

G. *Bottlenecks.*—No bottlenecks were encountered.

II. Production

A. Notice of award, June 11, 1952; definitive contract, May 26, 1954. Ten missile control and guidance equipments were started September 1954.

B. *Production schedules.*—Original schedule starting September 1954 and completing first part of 1955 was met.

C. *Factors limiting production.*—None.

D. *Overtime limitations.*—None.

E. *Adequacy of funds.*—No problem.

F. *Adequacy of manpower.*—No problem.

G. *Effect of change orders.*—No delays due to change orders.

TERRIER GUIDED MISSILE CONTROL AND GUIDANCE EQUIPMENT AN/MSG-3A

(A modification of AN/MSG-3 to extend the detection and tracking range and to permit control of a new type of Terrier missile.) Western Electric Co. is the prime contractor for control and guidance equipments only. Terrier missiles to be supplied to the Navy by another contractor.

I. Research and development

A. *Start of research and development.*—May 14, 1957, on a letter of intent.

B. *Status of research and development work.*—Development work is proceeding on schedule.

C. *Overtime limitations.*—Overtime is not authorized.

D. *Adequacy of funds.*—No delays for funding.

E. *Adequacy of manpower.*—Not hampered by lack of manpower.

F. *Effect of change orders.*—Changes in military characteristics of the ground guidance system have caused changes in scope of engineering. Since this system is to be used with a new missile, under development and not fully evaluated, changes have been and are expected to continue to be numerous.

G. *Bottlenecks*.—The answer here is most strongly influenced by the situation discussed under item F above.

II. Production

A. The letter of intent dated May 14, 1957, calls for modification of existing MSG-3 guidance and control equipments (attachment 6) and production of an additional quantity of new systems MSG-3A.

B. *Production schedules*.—Schedules not yet established.

C. *Factors limiting production*.—Agreement not yet reached on requirements or quantity of equipments. About 75 percent of components expected to be common to MSG-3 and MSG-3A. These can be ordered as soon as requirements and quantities are firm.

D. *Overtime limitations*.—No overtime is authorized.

E. *Adequacy of funds*.—No delays for funding.

F. *Adequacy of manpower*.—Not hampered by lack of manpower.

G. *Effect of change orders*.—Indeterminate.

[Telegram]

INGLEWOOD, CALIF., December 3, 1957.

From: Comdr. AFBMD HQ ARDC HQ, Inglewood, Calif.

To: Mr. J. P. Molnar, vice president, Bell Telephone Laboratories, Inc., Whippany Laboratory, Whippany, N. J.

I am concerned about maintaining the most effective effort for the ballistic missile program during the holiday period from December 20, 1957, through January 6, 1958. I realize that there are several solutions to the effective scheduling of work during this period; however, the policy you approve should receive complete study considering the schedule to be met. In adopting your policy, request you give top management attention to this potential problem.

(Signed) General SCHRIEVER.

[Telegram]

WHIPPANY, N. J., December 9, 1957.

Maj. Gen. B. A. SCHRIEVER,
WDD ARDC, Inglewood, Calif.:

Re your TWX December 3, 1957, on work scheduling over holiday period. BTL plans to continue effort at normal rate. Plant will be closed only December 25 and January 1.

J. P. MOLNAR.

Senator JOHNSON. I would like to ask the staff, as Mr. Weisl completes his questions from the letters, if they will duplicate the letters so that any member of the committee will be able to use them as background for his questions if he desires.

Mr. WEISL. Yes, sir.

Mr. HOLADAY. Mr. Chairman, could I ask that we be given copies of these, too? I think there are some very wonderful suggestions here.

RECOMMENDATIONS OF BELL LABORATORIES FOR MORE CONCENTRATION OF RESPONSIBILITY AND AUTHORITY

Mr. WEISL. I understand the Department of Defense has been given copies of most of these letters.

Mr. HOLADAY. If they have, they would be on my desk. Thank you.

Mr. WEISL. Here is a letter from the Bell Laboratories.

Senator SALTONSTALL. Mr. Chairman, might I interrupt to say I think it would be helpful if the full letter would be put in first as counsel reads it, and then have the counsel question from it so that

when we read the record, we can read the letter and then read his questions from it.

Senator JOHNSON. That is what the Chair intended to be done: that the entire text of the letters appear and that counsel's questions follow as each letter is introduced. It will appear in the record so that each member may have the text.

Furthermore, I think it would be well to duplicate the letters so that the members of the committee during their questioning period could have an opportunity to use them or the press could refer to them if they care to.

I will ask the staff to please take the letters of Mr. Silverstein, Mr. Newell, and Mr. Ramo and see that they are duplicated, if facilities are available.

Proceed, Counsel.

Mr. WEISL. In the letter from Bell Telephone Laboratories—

Mr. HOLADAY. Who is it signed by, please, the Bell Telephone letter?

Mr. WEISL. The Bell Telephone Laboratories letter is signed by W. C. Tinus, vice president, Bell Laboratories, Inc., and by S. C. Donnelly, assistant works manager, Western Electric Co.

Mr. HOLADAY. Thank you.

Mr. WEISL (reading):

RECOMMENDATION

1. There is need for more concentration of responsibility and authority. More concentration would reverse the present trend toward increasing numbers of people in Government who must be informed before decisions can be reached.

Senator JOHNSON. Will counsel give the date of that letter, please.

Mr. WEISL. The date of this letter, Mr. Chairman, is December 9, 1957.

More concentration would reverse the present trend toward increasing numbers of people in Government who must be informed before decisions can be reached. This applies to both project work and associated facilities. Once it is decided to proceed with a particular project, a single individual backed by a competent organization should have the responsibility and authority to carry out the development and production of the weapons system as a whole. The responsibility should carry through until the weapons system is in effective operation. A situation approaching this obtained in the early days.

2. Use of overtime should be at the contractor's discretion. While recent restrictions of overtime has not yet seriously affected our projects, it would seem wise for the future to allow contractors to use overtime as required to meet their obligations.

3. Longer-term authorizations would be desirable. Longer-term funding would, in many instances, permit more expeditious and efficient management.

4. Reduction in the amount of required paperwork would speed progress.

Do you agree with these recommendations?

Mr. HOLADAY. I think, in principle, sir, I would have to agree with them. They are very broad, and I think worthy of due consideration; yes, sir.

Mr. WEISL. You selected the Jupiter and the Thor to go into production; did you not?

Mr. HOLADAY. Yes, sir.

Mr. WEISL. The Jupiter is made at the—

Mr. HOLADAY. Army Ballistic Missile Agency.

Mr. WEISL. And the Director of the Research Projects Office of Patrick Air Force Base, Dr. Ernst Stuhlinger, is the director of the research in that program; is he not?

Mr. HOLADAY. No, sir.

Mr. WEISL. What is Dr. Stuhlinger's position?

Mr. HOLADAY. Patrick Air Force Base? I think you are mixed up, Counsel.

Mr. WEISL. Huntsville, Ala.?

Mr. HOLADAY. Yes, sir.

CHARGES MISSILE PROGRAM SUFFERED FROM LACK OF SUPPORTING RESEARCH

Mr. WEISL. The telegram is sent to me from the Patrick Air Force Base; but Dr. Ernst Stuhlinger is the assistant director? What is his title?

Mr. HOLADAY. I would have to check here.

Mr. WEISL. He signs it as Dr. Ernst Stuhlinger, Director, Research Projects Office, Patrick Air Force Base, Fla. You know who Dr. Stuhlinger is; do you not, Mr. Waggoner?

Mr. WAGGONER. Yes, sir.

Mr. WEISL. Who is he? What is his position?

Mr. WAGGONER. He is a member of Dr. von Braun's team. I believe he carries the title of assistant director, and he is engaged as part of the effort on the Jupiter missile program.

Mr. WEISL. He is what on the missiles program?

Mr. WAGGONER. He is engaged on the development effort on the Jupiter missile program.

Mr. WEISL. Here are the recommendations that Dr. Stuhlinger makes with reference to the missile program.

(The recommendations referred to are as follows:)

WASHINGTON, D. C., December 11, 1957.

EDWIN L. WEISL

*Senate Preparedness Investigating Subcommittee, Special Counsel,
Washington, D. C.:*

DEAR SIR: In reply to your letter of December 3, I would like to present the following answers to your questions. I am, of course, willing to have my answers identified with my name; however, I would appreciate it if my name did not appear publicly if these answers should be published.

1. Question. With respect to the missile and satellite programs, has there been an adequate and proper use of scientific manpower? If the answer is "No," please explain.

Answer. With respect to missile programs, there was a severe deficiency in the area of supporting research. Supporting research, as contrasted to basic research, is specifically undertaken to improve existing systems, and to prepare future development projects. This kind of research work should be initiated by the engineers and scientists who are actively engaged in development projects. The actual work would be done to a small part within the development projects, and to a greater extent by subcontractors. Ample capabilities for the initiation of such supporting research work exist at the Army Ballistic Missile Agency and at similar installations in the country, and a great many subcontractors would be eager and capable to carry out such work. However, there was practically no assignment, and by far not enough money, to initiate the urgently needed research work. Our country will continue to be poorly prepared for missile, satellite, and space-vehicle development projects unless the existing manpower for supporting research is utilized to a greater extent. Organizations like the Army Ballistic Missile Agency should be given a permanent research assignment to "advance the state of the art", without further specifications, but with a fixed and substantial amount of funding which is available regularly year after year.

With respect to satellite programs, the only project of this kind is Vanguard. It was accepted in 1955 from the Navy in preference to a satellite project proposed a little earlier by the Army. The reasons underlying this decision are a matter of record (deliberations and suggestions of the Stewart Committee, summer 1955).

Since the satellite capability of the Army was a direct outgrowth of an existing special flight test program, it continued to exist even though the satellite proposal was not accepted. The first Army satellite could have been launched in fall 1956. During 1956 and 1957, a number of offers were submitted by the Army ballistic missile agency through Army channels and through members of project Vanguard, suggesting that the Army proposal be accepted as a second source solution. The fact that none of these proposals was accepted until very recently shows that existing scientific manpower was not used properly and adequately with respect to the United States satellite program.

2. Question. With respect to the missile and satellite programs, please outline the bottlenecks, if any, which you have encountered in research and development work. If possible, please give specific examples.

Answer. When the IRBM, ICBM and satellite projects were initiated a few years ago, a number of technical problems existed which at that time had not been solved. Among them were rocket motors of sufficient power and reliability; a protective cover for a re-entering nose cone; a guidance system for long range missiles; vehicles powerful and precise enough to launch satellites; methods to calculate satellite orbits from observational data; and others. Today, solutions for all of these problems exist which are satisfactory at least for the time being. Although the technical solutions of these and similar problems normally determine the rate of progress of a development project, the decisive bottlenecks encountered during recent years at the Army ballistic missile agency were caused rather by the lack of a clear-cut assignment of an IRBM or satellite project; by the uncertainty whether IRBM work would be carried on or discontinued soon; and by the lack of manpower, funds and assignment for supporting research.

3. Question. With respect to the missile and satellite programs. Please outline any other bottlenecks which in your experience have impeded the development and production of missiles and satellites. If possible, please give specific examples.

Answer. In general, "too little" was done "too late." The assignment of new projects, instead of pushing vigorously the advancement of the art, followed only anxiously the monetary requirements of one of the services. The development of more powerful rocket motors should have been initiated years ago. The two existing IRBM projects, Thor and Jupiter, have been living for a full year under the threat that one of them would be discontinued soon. Instead, both should have been pushed forward, the one to fill the immediate requirements of the Armed Forces, the other one to form a powerful nucleus for further development.

To some extent, development was impeded by too much secrecy at the wrong places. Allotment of funds and personnel spaces, and assignment of new projects, should be made on the basis of past accomplishments. If these accomplishments are not known to the allotting committees, or to those who influence the decisions of the committees, wrong decisions are unavoidable. Lack of knowledge of successes and achievements had obviously caused misjudgments of the capabilities of the ABMA during the past year.

The difficulties in the Vanguard satellite project are caused, at least to a great extent, by the unrealistic attempt to carry out such a big project as a strictly scientific venture, without taking advantage of existing military projects. Had the satellite project been made part of a military project, it would have drawn the greatest benefits from the experience of an integrated team, from the availability of flight proven components, and from an almost unlimited growth potential. The scientific purpose of the IGY satellite could not have been served better than by a combination of a scientific team like the upper atmosphere research panel, and a guided missile team like the Army Ballistic Missile Agency.

4. Question. Please outline any recommendations which you may have for accelerating the development and production of missiles and satellites.

Answer. The Rocket and Satellite Research Panel, which is affiliated to the National Academy of Sciences, recently completed a plan for a national space establishment, an organization directly under the executive branch of the Government which would plan, direct, and budget all the development projects related to missiles, satellites, and space vehicles. The Senate Preparedness Investigating Subcommittee has been informed of this plan. It incorporates a proposal which suggests the maximum possible use of all existing guided missile development teams for an integrated development program. This plan visualizes guided missiles for immediate military use; guided missiles for future military use on the earth, carrying warheads, reconnaissance equipment, freight or troops; carrier vehicles for orbital missions; unmanned and manned satellites for military use

and for peaceful applications such as global weather survey, early storm warning, television relay stations, and communications; vehicles for unknown exploration of the moon; and systems for planetary exploration.

(End sec. 1.)

Dr. ERNST STUHLINGER,
Director, Research Projects Office, Patrick AFB, Fla.

WASHINGTON, D. C.

EDWIN L. WEISL,
Special Counsel, Senate Preparedness Investigating Subcommittee,
Washington, D. C.

Section 2 of 2.

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This plan visualizes guided missiles for immediate military use; guided missiles for future military use on the earth, carrying warheads, reconnaissance equipment, freight or troops; carrier vehicles for orbital missions; unmanned and manned satellites for military use and for peaceful applications such as global weather survey, early storm warning, television relay stations, and communications; vehicles for unmanned and manned exploration of the moon; and systems for planetary exploration. Particular attention is given to the extremely important interrelation between scientific research work and the development of systems for military use. Even though the greater part of the scientific experiments will be made without direct military purpose, the military will take the richest harvest from scientific research work. Scientific missile and space projects should therefore not be separated from military projects. Scientific projects deserve the best experience, the best components, and the best facilities which are available, and military projects should have the full benefit of the advanced thinking and experimenting of the best research scientists. Without a complete mutual integration of military and scientific missiles, satellites and space vehicle projects, both of them will suffer unduly.

The National Space Establishment should have the benefit of the advice from the developments teams, but it should make its decisions only on the basis of foresight, and optimum use of existing capabilities. Interservice rivalry should not influence those decisions.

Project assignments should not be made according to services, but according to development teams. The capabilities of a team should be judged only from its real accomplishments, and from the length of time it has been involved in successful development work, but not from mere paper studies, or from the boldness with which ultrashort development times are promised. There is ample experience now in this country to realistically estimate the time necessary for the development, lab testing, flight testing, and completion of a missile project. This experience should be utilized to the fullest extent.

Above all, it should be realized that research and development teams are the most valuable asset a country can have on its defense account. Full utilization of all of them according to a well-conceived master plan will not only be the wisest but, in the long run, also the cheapest approach to our defense problem.

Dr. ERNST STUHLINGER,
Director, Research Projects Office, Patrick Air Force Base, Fla.

Mr. WEISL (reading):

Answer. With respect to missile programs, there was a severe deficiency in the area of supporting research. Supporting research, as contrasted to basic

research, is specifically undertaken to improve existing systems and to prepare future development projects.

Mr. HOLADAY. Would you read that again, please?

Mr. WEISL. I will read the quote:

With respect to missile programs, there was a severe deficiency in the area of supporting research.

Do you agree that there was a severe deficiency in the area of supporting research in Dr. Stuhlinger's program?

Mr. HOLADAY. I guess I would have to have more information from him to understand this.

Mr. WEISL. This is not a direct quotation. The Army Ballistic Missiles Agency at similar installations throughout the country has ample capabilities for such supporting research work. Do you agree that they do?

Mr. HOLADAY. It is rather hard for me to follow these recommendations.

Mr. WEISL. Very well. Let me read from his telegram. The reason I paraphrased that was not to read the entire telegram which I will pass to the Senators, of course, and put in the record, but I now quote from the telegram:

However, there was practically no assignment and by far not enough money to initiate the urgently needed research work. Our country will continue to be poorly prepared for missiles, satellites, and space vehicle development projects unless the existing manpower for supporting research is utilized to a greater extent. Organizations like the Army Ballistic Missile Agency should be given a permanent research assignment to "advance the state of the art," without further specifications, but with a fixed and substantial amount of funding which is available regularly year after year.

Mr. HOLADAY. There is certainly merit to his suggestion. This Army Ballistic Missile Agency has carried on this type of research. The Navy carries on this type of research, and I am sure that if we continue down to the universities and organizations that have been set up, we will certainly get a number of suggestions for increasing both basic and applied research.

BASIC RESEARCH IS "FINDING OUT WHAT YOU DO NOT KNOW"

Senator JOHNSON. Senator Saltonstall would like to have you define "basic research" for the record.

Senator SALTONSTALL. Basic and supporting research, Mr. Chairman, basic research, industrial research, and supporting research, and the difference between supporting research and industrial research particularly.

Mr. HOLADAY. Sir, I think there are probably as many definitions as there are men; so I will use my own definitions, sir. The basic research is finding out what you do not know, and this is where we have to increase our knowledge. "Basic" to me is a very important part of the program.

The applied research is taking this basic know-how, new knowledge, and applying it to develop any type of new equipment.

Now, the industrial research that I think you have reference to, Senator, is the type of research which most industrial firms carry forward, and in most cases they will do a large portion of it as applied research and a small amount of basic. They in turn do some small

amount of basic in their own laboratories, but usually this is carried forward by money made available to universities to carry forward basic research.

Senator SALTONSTALL. What does supporting research mean?

Mr. HOLADAY. Supporting research, I believe, as it is used here, is the same as applied research.

Senator SYMINGTON. Mr. Chairman, may I ask one question for clarification?

Senator JOHNSON. Senator Symington.

Senator SYMINGTON. Would you describe pure research as the same as basic research?

Mr. HOLADAY. Yes, sir.

Senator SYMINGTON. Yes, sir.

Mr. WEISL. Dr. Stuhlinger goes on further on the satellite program. He states in his telegram, and I quote:

Since the satellite capability of the Army was a direct outgrowth of an existing special flight test program, it continued to exist even though the satellite proposal was not accepted. The first Army satellite could have been launched in fall 1956.

Do you wish to make any comment on that, sir?

Mr. HOLADAY. I would have to go back and look at my records. I think he is probably just a little bit early.

Mr. WEISL. Yes, sir.

Mr. HOLADAY. I would have to check very carefully on that.

Mr. WEISL. Then it continues:

The Army continued to press its program as a second source solution. The fact that none of these proposals was accepted until very recently shows that existing scientific manpower was not used properly and adequately with respect to the United States satellite program.

Do you wish to make any comment on that?

Mr. HOLADAY. No, sir.

UNCERTAINTY AS TO IRBM HAMPERED THE ARMY

Mr. WEISL. Then question No. 2:

What bottlenecks have you encountered in research and development work?

Answer. The decisive bottlenecks encountered during recent years at the Army Ballistic Missiles Agency by (a) the lack of a clear-cut assignment of an IRBM or satellite project, (b) the uncertainty whether IRBM work would be carried on or discontinued soon, (c) the lack of manpower, funds and assignment for supporting research.

Any comment on that, sir?

Mr. HOLADAY. No, sir.

Mr. WEISL. Question No. 3:

What bottlenecks have you encountered in the development and production of missiles and satellites?

Answer. A. Missiles: In general, too little was done too late. The assignment of new projects instead of pushing vigorously the advancement of the art followed only anxiously the monetary requirements of one of the services. The two existing IRBM projects, the Thor and the Jupiters, have been living for a year under the threat that one of them would be discontinued soon. Instead, both should have been pushed forward, the one to fill the immediate requirements of the Army, the other one to form a powerful nucleus for further developments.

Any comment on that, sir?

Mr. HOLADAY. The only comment that I think we should make for the record, is that the Army has no requirement for an IRBM. It is an Air Force requirement.

Mr. WEISL. You mean under its roles and missions?

Mr. HOLADAY. Yes, sir.

Mr. WEISL. But do you agree with what he said, that they should not have been under a threat that one should be discontinued and the other continued? The decision should have been made earlier?

Mr. HOLADAY. This is probably right, but I would rather agree with his statement that both of them should go forward.

Mr. WEISL. Other remarks, and I quote:

1. Development has been impeded by too much secrecy in the wrong places.

Mr. HOLADAY. I do not know what he has reference to there, "too much secrecy."

Mr. WEISL. Further I quote:

Assignment of new projects. Allotment of funds and personnel spaces should be made on the basis of past accomplishments. In the past, mistakes have been made in these decisions because of the lack of knowledge by the allotment and assignment committees.

Mr. HOLADAY. I think he is criticizing the Army organization there, is he not?

Mr. WEISL. Do you agree with him?

Mr. HOLADAY. I do not like to criticize the Army.

Senator JOHNSON. I do not imagine he likes to, but do you agree with him?

Mr. HOLADAY. I do not believe I have enough facts to comment one way or the other, Senator. I am sorry.

Mr. WEISL. Dr. Stuhlinger goes on—

Senator JOHNSON. Take notes of these complaints, though, in your new position because it is pretty important that you get the facts if these things are true.

Go ahead, Counsel.

OUR ROCKET MOTORS HAVE SUFFICIENT THRUST

Mr. WEISL (reading):

3. Development of more powerful rocket motors should have been initiated years ago.

Do you agree with that, sir?

Mr. HOLADAY. I don't know that I could agree with it. Probably in the broad view in which he said that if we had more and larger motors going, this would be desirable. I think this is right. We have progressed our motors and the size of them at a very rapid rate.

I find from my experts in the missile game that we are not handicapped by lack of thrust. We do have larger thrust motors under development.

Mr. WEISL. Have you a motor that has a thrust sufficient to place a thousand-pound satellite in orbit as the Russians have?

Mr. HOLADAY. Sir, this again becomes a very technical question as to how much thrust you have in the first stage, the second stage, the third stage, and the fourth stage.

Mr. WEISL. But it is a fact, isn't it, Mr. Holaday, that the Russians have a motor or a cluster of motors that were able to put a thousand-pound satellite in orbit?

Mr. HOLADAY. Yes, sir. I believe we have this same ability.

Mr. WEISL. We do have the same ability?

Mr. HOLADAY. I believe we do.

WE ARE PLANNING TO PUT 1,000-POUND SATELLITE INTO ORBIT

Mr. WEISL. When do you think we will put a thousand-pound satellite in orbit?

Mr. HOLADAY. We are planning that. I would not like to disclose any dates at this time.

Mr. WEISL. What is the weight of the satellite for Vanguard, that was to have been put in orbit?

Mr. HOLADAY. Twenty-one pounds.

Mr. WEISL. Twenty-one pounds?

What was the weight, Mr. Waggoner?

Wasn't the weight 4 pounds?

Mr. WAGGONER. The scientific satellite for Vanguard, the one which will be launched, is scheduled to be launched, in March to meet the full IGY requirements, is 21 pounds.

Mr. WEISL. I am talking about the one that did not go in orbit.

Mr. WAGGONER. The tracking item which has been called a satellite is 4 pounds. It is a transmitter to enable the people to track it to assure that such an item has been placed in orbit.

Mr. WEISL. That one that did not go up weighed 4 pounds?

Mr. WAGGONER. The tracking device weighed 4 pounds.

Mr. WEISL. I mean the device that we were trying to put in orbit.

Senator JOHNSON. Will the witness please try to give us the information we want?

The witness knows what we want. He is admitting it but only after he has lost us. Will counsel rephrase your question?

Mr. WEISL. Please answer it.

Mr. WAGGONER. The tracking device weighed 4 pounds.

Mr. WEISL. The tracking device we were trying to put in orbit with the Vanguard, what did it weigh?

Mr. WAGGONER. It weighed 4 pounds.

Senator JOHNSON. If it is agreeable the committee will take a recess for 5 minutes.

(Short recess.)

Senator JOHNSON. The committee will please come to order.

Mr. Holaday, you have been on the witness stand for more than 2 hours this morning, and we realize it has been quite a strain.

Therefore we felt that all of us should take a little recess. We are glad to have you back. We plan to run the hearing until about 1:15 and then recess until 2:30 this afternoon.

Counsel, will you proceed with your examination of the witness?

We thank you, Mr. Holaday, for your patience and understanding and for your willingness and ability to go through this situation.

Mr. HOLADAY. Thank you. I am very glad to cooperate. I think you have been very cooperative, too, sir.

Senator JOHNSON. Thank you.

Mr. Counsel?

Mr. WEISL. Mr. Holaday, I have read you recommendations from the Naval Research Laboratory, from some of the Army or Air Force research laboratories, scientific consultants, technological consultants, physicists, and scientists.

RECOMMENDATIONS OF MANAGER OF THE ATLAS PROGRAM

Now I would like to read some recommendations from the manufacturers, the practical people who are charged with the duty of delivering the goods for these missiles. I would like to read some recommendations made by the company that manufactures the Atlas, the ICBM missile upon which this country is relying for its defense. The document itself contains classified information and I shall therefore read only the recommendations. The complete document will be included in the classified record.

Mr. WEISL (reading):

Recommendation 1. A greater sense of urgency must somehow be engendered in the minds and reflected in the actions of everyone in the Government and throughout the hundreds of industrial organizations directly involved in the accomplishment of the Atlas program.

2. The vast majority of people concerned—

Senator JOHNSON. Mr. Counsel, I wonder if we could ask if he agrees with that statement No. 1?

Mr. HOLADAY. Yes, sir. I would appreciate if I could know who is writing this, Mr. Counsel. It is of some help to me.

Mr. WEISL. Yes, sir; Gen. James R. Dempsey, the manager of the Atlas program.

Mr. HOLADAY. Yes, sir.

Senator JOHNSON. He has answered yes to the first one.

Now proceed.

Mr. WEISL (reading):

The vast people concerned with the Atlas program are unaware of either the magnitude of the Soviets' technical program or the imminency of U. S. S. R. operational intercontinental ballistic missiles.

Any comment on that, sir?

Mr. HOLADAY. No, I don't believe so.

Senator JOHNSON. Do you believe that to be a true statement?

Mr. HOLADAY. I am not definite as to how much information they have. It may be entirely correct that they did not have all of the information. I would prefer to talk to Mr. Dempsey to find out exactly in detail what he means by that statement.

Senator JOHNSON. Do you think it would be helpful if they had as much as security would permit?

Mr. HOLADAY. Yes, sir. Those people on this program are cleared certainly in the secret and top secret, and I am sure that they are getting that type of information.

I don't know just what Mr. Dempsey has reference to.

Senator JOHNSON. It might be a good medicine for some of that lack of urgency they are talking about, might it not?

Mr. HOLADAY. I think he has a point, if he does not understand what his competition is, he certainly is in a pretty bad fix. I agree with you.

Senator JOHNSON. Thank you. Proceed, counsel.

Mr. WEISL (reading):

Further, therefore, it is recommended that a more general dissemination of information as to what the Soviets are doing in the ballistic-missile field be accomplished.

Such a program of education would lend an appropriate sense of urgency to all concerned.

Any comment, sir, on that?

Mr. HOLADAY. No.

AGREES TO NEED FOR DISSEMINATION OF INTELLIGENCE

Mr. WEISL (reading):

It is further recommended that technical intelligence as to the Soviet approaches and rates of progress in the ballistic missile field be formally disseminated throughout the establishment of a system for that purpose.

The sharing of such technical information as to Soviet progress by contractors concerned with our own ballistic programs could certainly help accelerate the development of our own missiles.

Senator JOHNSON. Do you agree with that?

Mr. HOLADAY. I think I have to agree with him; yes, sir.

Senator JOHNSON. And you agreed with the last one? I did not hear you.

Mr. HOLADAY. Yes, sir.

Mr. WEISL (reading):

One further point in the matter of disseminating information. The inter-communication of technical information between programs with our own Defense Department could be improved.

For instance, abandonment of the need-to-know restriction and reduction of security in this regard to a level of secrecy throughout the missile program would expedite such communication.

As it now is, much information useful to those active in the development of missiles is unavailable to them because they don't even know that it exists, and the people who know it exists are apparently unaware that it can be helpful in developing acceleration of our missile programs.

Mr. HOLADAY. We have a very extensive procedure and technique for the exchange of information, but I find that I must agree with him that there seems to be a mountain that we do not always get over in getting this information around.

I am very much disturbed at times in connection with the program that a man on one program is not keeping up to date in connection with the other program.

I sometimes question, however, whether this is secrecy or just the lack of people that have this necessary clearance getting around and picking up the information.

I think there is a part which industry can do on its side to see that it has its engineers around, where I am sure there is no restriction for them to get around, to find out what the results of some previous tests may have been.

This is a very complicated problem. I have been worried and working on it for quite some time. I am sure I do not have all the solutions.

Mr. WEISL (reading):

The present planning of the Government for the operational employment of the Atlas is currently known to us as less than it should be, and if we correctly understand the Soviet accomplishments in the ballistic missile field, the present Atlas program will tend to widen rather than close the gap between the United States and the Soviet ICBM capability.

That is a most serious charge that the present program will widen the gap rather than close it.

Mr. HOLADAY. He has two statements there.

One, am I correct that he talks about not being informed as to the number of units that are being used or the method of employment?

What is the interpretation of that first part of that, sir?
Will you read it again?

ATLAS PROGRAM BEING ACCELERATED

Mr. WEISL. Yes, sir. [Reading:]

The present planning of the Government for the operational employment of the Atlas as currently known to us is less than it could be, and if we correctly understand the Soviet accomplishments in the ballistic missile field, the present Atlas program will tend to widen rather than close the gap between the United States and Soviet ICBM capability.

Mr. HOLADAY. Thank you, sir. We are accelerating the Atlas program. The amount of money going into it I do not wish to disclose, but the program is being accelerated to make more units or squadrons available at an earlier date.

Senator JOHNSON. When was that decision made?

Mr. HOLADAY. That decision was touched on by Secretary McElroy. The letter has gone forward to the Air Force accelerating the program.

Senator JOHNSON. You have made a very nice statement, all of which I appreciate.

Now would you answer my question?

When was that decision made?

Mr. HOLADAY. The decision was made and reported—I believe this is correct—by Mr. McElroy during his——

Senator JOHNSON. Testimony?

Mr. HOLADAY. Testimony.

Senator JOHNSON. Did he make it in front of the microphone or did he make it before that time?

Mr. HOLADAY. No, the decision was made prior to that.

Senator JOHNSON. How long prior to that?

Mr. HOLADAY. I can't answer you, but it was several days before the Secretary came over here. This decision was made verbally. This has been confirmed in a letter from my office to the Secretary of the Air Force, after we got the details as to fitting the entire program together.

Understand that we did have to study the details here because again we have to fit the missiles, the size unit in which they are going to be deployed, the training, and the ground-support equipment.

Senator JOHNSON. What is the date of the letter in which you confirm the oral decision?

Mr. HOLADAY. I believe it is yesterday's date.

Senator JOHNSON. Yesterday, and you cannot put the letter in the record because of its secret nature?

Mr. HOLADAY. That is right.

Senator JOHNSON. But you will discuss that fully in executive session?

Mr. HOLADAY. Yes, sir.

Senator JOHNSON. Will counsel please take note of that so we can go into that further?

I congratulate you on making the decision.

Mr. WEISL. I am omitting, Mr. Holaday, some of these recommendations because my associates tell me some of them are classified, but I will show them all to you.

Mr. HOLADAY. I appreciate that. Thank you.

Mr. WEISL. Yes.

Question: Has there been any limitation imposed at any time on the use of overtime?

That was our question.

If so, has there been any change with respect thereto?

There has not at any time been a rigid not-to-exceed limitation on overtime. The use of overtime has been subject to approval by the Air Force, and from the 1st of July to the 2d of December 1957 the authority of the in-plant Air Force representative to approve overtime was limited to 9 percent.

Mr. HOLADAY. That is correct. I would like to add considerably more detail to that.

Mr. WEISL. He does add more detail.

May I read it?

Overtime in excess of 9 percent during that period required special approval by the ballistic-missiles office in Los Angeles.

Notwithstanding the percentage limitation, Convair has understood that overtime, in whatever amount, would be approved if it could be shown that program schedules would otherwise be jeopardized.

Mr. HOLADAY. Yes, sir; the statement—

Mr. WEISL. And it says that the 9-percent limitation was withdrawn on December 2, 1957?

Mr. HOLADAY. That is what I wished to add. Thank you.

Senator JOHNSON. But you do agree with the Secretary of Defense that the most serious bottleneck that he has encountered has been the limitation that had been placed on working more than 40 hours a week? Could I read you his testimony to refresh your memory:

Mr. WEISL. Can you, without breaching security, tell the committee what bottlenecks you found and what remedies you took to eliminate.

Mr. McELROY. Well, the principal bottleneck that we felt we found was the limitation on overtime in certain instances. Where that was discovered, we moved rather quickly in order to authorize overtime.

What does that mean, "authorize overtime"; more than 40 hours per week?

Mr. HOLADAY. Yes.

Senator JOHNSON. "As the service"—that means the Army, Navy, and Air Force?

Mr. HOLADAY. Yes, sir.

HOLADAY CALLS OVERTIME LIMITATIONS ONE OF PRINCIPAL BOTTLENECKS

Senator JOHNSON (reading):

As the services indicated that any such freedom from restriction would help them in speeding up their program.

Do you agree with that statement?

Mr. HOLADAY. Yes, sir.

Senator JOHNSON. And you agree that was the principal bottleneck?

Mr. HOLADAY. It is one of the principal bottlenecks.

Senator JOHNSON. And you agree on December 2 you took steps to eliminate it?

Mr. HOLADAY. Yes, sir.

Senator JOHNSON. And you agree, with the services, that will speed up the program?

Mr. HOLADAY. Yes, sir.

Senator JOHNSON. And you agree that eliminating the 40-hour-week limitation on missiles is not going to affect the cotton farmers so far as producing cotton or the auto worker or the steelworker or anybody else, that this pertains to missiles. This order pertains only to the missile work; is that not correct?

Mr. HOLADAY. That is correct.

Senator SALTONSTALL. Mr. Chairman.

Senator JOHNSON. Senator Saltonstall.

Senator SALTONSTALL. May I ask a question?

Senator JOHNSON. Senator Saltonstall.

Senator SALTONSTALL. Mr. Holaday, do I understand when you refer to overtime you mean to overtime in production as distinguished from research and development? As I understood it, there was never an overtime order put on research and development. The overtime order was put on production, and then it was withdrawn. Is that a correct statement, or is it incorrect?

Mr. HOLADAY. Thank you, Senator. It is correct.

In any of the limitations that we were putting on, we had no restriction in this research and testing phase of the program. This was our bottleneck at that particular time. We did have a restriction which applied to production.

Also, in any of the letters which went out at that time discussing overtime, we always carried the paragraph, "If these hurt you in any way, you are to call them to your attention immediately," but you are correct, Senator. Thank you for calling that to my attention.

Senator JOHNSON. But, in effect, the restriction you had on production would reflect itself indirectly as a restriction on the other; would it not?

Mr. HOLADAY. If we were short of hardware, that would be true.

Senator JOHNSON. Sure, but the point is, the American people should know that was (a) your principal bottleneck, (b) you have taken steps to remedy it, and the steps you have taken are those recommended by the services, and that the Secretary made the decision and that you concurred in it.

Mr. HOLADAY. Yes, sir.

Senator JOHNSON. Thank you.

Mr. WEISL. As I told you, I will show you the whole letter, but my censor here is directing me as to which are security and which are not. Has Convair been hampered, directly or indirectly, by lack of funds?

As indicated above, the general slow pace of Convair's work on ballistic missiles prior to mid-1954 was directly attributable to fund limitations.

In respect to the accelerated effort which commenced in mid-1954, the program has not been directly affected by lack of funds.

However, an overall atmosphere of economy prevailed prior to Sputnik I and II, which had the indirect effect of tending to weigh fiscal considerations heavier than others in the management of the program.

Then the question was asked:

What other bottlenecks, if any, have you encountered in your research and development work on each missile?

Answer. It must be understood that the development of the Atlas represents a major state of the art advancement.

Much of the system imposes greater demands for manufacturing accuracy and component reliability than comparable airplane components.

These requirements have generated need for special test facilities and test equipment of equal or greater complexity and accuracy.

The cumbersome process by which facilities are furnished by the Government to contractors has delayed procurement and activation of certain required manufacturing and test facilities.

Considering the urgency of the Atlas program, it would appear that the cautious approach, through acceptance of the contractor's justification material, has had delaying effects.

It could be mentioned that the low profit—

Well, we do not want to go into that.

Mr. HOLADAY. Could I comment on that, sir?

Mr. WEISL (reading):

It could be mentioned that the low profit margin allowed airframe contractors by the Government precludes large private investments in specialized and rapidly obsolete capital facilities.

Mr. HOLADAY. Could I comment on that, sir?

Mr. WEISL. Yes, sir.

DOES NOT KNOW WHERE DEFICIENCY OF FUNDS WAS LIMITING FACTOR

Mr. HOLADAY. I certainly appreciate very much the understanding which the gentleman who wrote the letter has indicated as to the importance here of having the ability to carry forward a good engineering job; that he must test to acquire this reliability.

I do not know of any place in which money has restricted them, at least based upon the advice of General Schriever to me, and the large amount of money which we have spent on testing devices; sure, some of them did not get built quite as quickly as they anticipated; but in the large amount of test equipment, I did not realize that we were handicapping them in any way.

We certainly have, if you have not seen them, a terrific amount of backup test facilities for programs of this type.

Mr. WEISL. We have several letters from manufacturers, which I will make available to you, Mr. Holaday, who have recommendations along similar lines. I don't want to burden the record with all of them at this time.

Mr. HOLADAY. I would certainly like to have them.

Mr. WEISL. You will have them, sir.

Mr. HOLADAY. I appreciate it, because I would like to go to those people and talk with them.

Mr. WEISL. I am sure of that, and you will have them.

Mr. HOLADAY. Thank you.

RECOMMENDATIONS OF CHANCE VOUGHT, MANUFACTURER OF REGULUS

Mr. WEISL. Here is a set of recommendations from the Chance Vought Co., which manufactures the Regulus I and Regulus II for the Navy:

The following recommendations are offered in a spirit of constructive criticism based on this contractor's experience in both the Regulus I and the Regulus II programs.

A. Within the military, strengthen and streamline the systems and agencies charged with management and procurement of modern technically complex weapons.

B. Provide the contractor with access to information that would also permit him to act fully in his capacity of weapons system contracting. Too frequently decisions are made with only limited information.

C. Reduce administrative lead time, official authorization, and funding to a predictable schedule that will permit orderly, prompt, and efficient action on all phases of the program.

D. Establish effective long-range planning and adequate long-range funding of missile programs so that the programs can proceed as fast as possible without frequent maneuvering on a fire-drill basis.

E. The present method of funding of the defense programs on a year-to-year basis greatly restricts the ability of both the Navy and its contractor to adequately plan a comprehensive continuing program.

Any program plan establishing budget for subsequent years to carry the weapons system to completion is subject to change without notice from one fiscal year to the next. This situation has resulted in no stabilized long-range Navy Department plan for the Regulus guided missile weapons system development and utilization.

F. Timely use of overtime in key areas can do much to overcome potential bottlenecks, particularly in the early stages of research and development when tests vital to the development of operational articles are being conducted.

The time consumed in following established normal channels for requested overtime can result in authorization being received too late to be effective. This contractor recommends a relaxation of limitations and restrictions now imposed as well as improvements in present overtime administration procedures, particularly in areas where the judicious use of overtime will show a potential saving in time and money.

Mr. Holaday. There are some very good suggestions there.

I believe most of them we have complied with. The question of funding these programs, particularly in missiles, we must understand that we have 18 to 24 months' lead time, and the programs have to be laid out well in advance.

This also has the complication that you cannot accelerate them quickly because of the long lead time.

Mr. WEISL. I will make available to you, Mr. Holaday, with the consent of the committee, all the communications that come to us, so that you can have before you the suggestions and recommendations and complaints of the scientists, the technologists, the contractors, and all persons that we know and whom we have contacted to give us this information.

I assure you this is done by the committee not with the idea of making your task harder, but with the idea of helping you to accelerate this program which is of such vital importance to the safety of the country.

Mr. HOLADAY. I appreciate that. I think you have acquired here some very excellent advice and recommendations. I think that we must have them, and I would like to follow through on as many as we possibly can.

SENATOR JOHNSON REQUESTS REPORT ON MANUFACTURER'S RECOMMENDATIONS

Senator JOHNSON. Mr. Holaday, I appreciate very much your constructive response to the counsel's suggestion there. If you will make a synopsis of these recommendations and give study to them, and where you feel that they are good ones, act on them and then report back to the committee on the action taken. Those that are being studied, say so, and those that you reject so indicate so that the committee will know what attention has been given and what if any action has been taken.

Mr. HOLADAY. Thank you.

Senator JOHNSON. Thank you. Mr. Weisl?

Mr. WEISL. We have communicated at the direction of the chairman with at least 100 suppliers and scientists so that we can get all sides of this story, in an effort to help you and the country to its work.

I would like to question you about the Thor-Jupiter decision. This questioning, Mr. Holaday, I assure you is not with a view of criticizing or judging this decision, but merely to arrive at the basis on which the decision was made, since it is a costly decision in terms of money.

Mr. HOLADAY. Yes, sir; I will be very glad to help.

Mr. WEISL. It will take more than 5 minutes, Mr. Chairman.

Senator JOHNSON. Go ahead.

We will run until 1:15.

Mr. WEISL. What is the range of the Thor missile?

Mr. HOLADAY. Its maximum range is 1,500 miles. It is deployed in the range from some 300 to 400 miles to 1,500 miles.

Mr. WEISL. And what is the range of the Jupiter missile? Is that approximately the same?

Mr. HOLADAY. Yes, sir.

Mr. WEISL. Is the engine that is used for the Thor any different than the engine that is used for the Jupiter?

Mr. HOLADAY. Yes, sir; slightly. They are made by the same company but there are modifications in the engines to fit to the guidance system, the method of control several months before—

Mr. WEISL. What company manufactures both engines?

Mr. HOLADAY. North American Aviation Co.

Mr. WEISL. Is there any difference in the propulsion of both these missiles?

Mr. HOLADAY. Being similar engines, they both use identically the same fuel.

Mr. WEISL. Is there any difference in the hardware, the metal?

Mr. HOLADAY. Yes, sir.

Mr. WEISL. What is the difference?

Mr. HOLADAY. It is a slight difference in the type of metal used. Either one can be used. I would not like to disclose the—

Mr. WEISL. Very well, sir. Is there any difference in the guidance system?

Mr. HOLADAY. Yes, sir; there is a difference in the guidance system. These are technical differences.

Mr. WEISL. Would you prefer to discuss them in executive session?

Mr. HOLADAY. Yes, sir.

Mr. WEISL. Is there any other difference?

Mr. HOLADAY. There is a difference in the nose cone. There is a difference in the method of fusing. There is a difference in ground support equipment. This is being studied very carefully at the present time. It might be of interest to you to know that Tuesday and Wednesday, with the Secretary of the Air Force and the Secretary of the Army, we visited both ABMA and the Chrysler Corp., and we are leaving here Sunday night, spending Monday in California, where we will study very carefully the Thor. This is to determine decisions on the ground support equipment, the method of deployment, things like that.

Mr. WEISL. Did you not study the Thor and the Jupiter before you made the decision?

Mr. HOLADAY. Yes, sir; I have very definitely. I am trying to take some of my friends with me on this, too.

Mr. WEISL. Now, in making the decision, whom did you consult?

Mr. HOLADAY. Sir, I would like to start that back with the time that I would say my hope was to get down—to get this missile system, the Jupiter and Thor—down to one missile system. I recommended to the Secretary of Defense quite some months ago that we should attempt to make a study, and I made a recommendation that this study be held at the very highest level where we could consider the facts, and I recommended that General Schriever and General Medaris and myself become a committee for making this study to see if we could reduce this down to one missile system.

RECOMMENDATIONS AS TO THOR AND JUPITER

Mr. WEISL. That is known as the Thor-Jupiter Committee?

Mr. HOLADAY. That is known as the Thor-Jupiter Committee. From the time that that committee was appointed, I spent long and detailed visits to a number of the places studying the method of manufacture and techniques, discussing with the two members of my committee the pros and cons of this whole thing.

This went on for some month and a half or 2 months in detailed discussion, and it resulted in the report that we continue with both systems.

Mr. WEISL. Excuse me, sir; may I interrupt?

Mr. HOLADAY. Yes, sir.

Mr. WEISL. Did General Schriever, who was on that committee, recommend the use of both systems?

Mr. HOLADAY. No, sir.

Mr. WEISL. Did General Medaris, who was on the committee, recommend the use of both systems?

Mr. HOLADAY. No, sir.

Mr. WEISL. And you were the only one really on that committee that recommended the use of both systems?

Mr. HOLADAY. At that particular time, sir.

Mr. WEISL. Yes, sir.

Mr. HOLADAY. I recommended that the development work should proceed—this was in September—that the development work should proceed, that we should modify the work on the Jupiter because in the early stages it had been restricted in not being able to go ahead with its ground-support work, that we modify the program, put more money into it, in order that the Army could proceed with engineering work on ground support, and that we also establish a coordination between the Army and the Air Force so that both missiles could be adjusted to use common ground-support equipment.

This required coordination work and this is the work that has been going on for quite some time.

Mr. WEISL. May I interrupt, if I may? I do not want to disturb your chain of thought, but each general recommended his own system; is that not right?

Mr. HOLADAY. That is correct, sir. Now, as we have continued the work, as you well realize, I have used lots of people for discussion as to getting down to 1 system, going ahead with 2 systems or eliminating both systems or all of these various combinations. Not

only have I had the advice and recommendations from the two generals, but I have dealt with other military people, the people on my own staff. I have taken this up with the individuals of my scientific advisory board, and I have discussed it with various secretaries, both the Army and the Air Force.

This resulted, as you well realize, when we decided to step up our program, that I made a recommendation to the Secretary of Defense that both programs should be used, and set forth my ideas why they should be used. This was discussed in quite some detail, and fortunately, the press came to my aid and assistance at this time, because it is very seldom that I am permitted to talk about what goes on in the White House, but the Vice President helped me this particular time, and the press has recorded it.

In the meeting which took place at the White House, which was on November the 27th, which was the day before we announced or Mr. McElroy announced to this group the decision, in which the Vice President was asked:

Defense Secretary McElroy announced on the Hill this afternoon that a decision had been taken last night to proceed with the production of the Thor and Jupiter at the same time. Did you have any part in that decision last night or was the White House involved?

The Vice President stated:

I was present at a meeting in the White House yesterday afternoon at which the final decision was made with regard to the Thor and Jupiter programs. I would like to say, however, that prior to that time, Secretary McElroy had consulted with the President and had laid out the preliminary lines of the decision that he submitted to the group that met in the White House.

Who was present at this meeting?

I would say Secretary McElroy; Dr. Killian; the Deputy Secretary of Defense, Mr. Quarles; Mr. Holaday; Governor Adams; the Director of the Budget.

Mr. WEISL. What Adams?

Mr. HOLADAY. Governor Adams

The Director of the Budget, Mr. Brundage; the Secretary of State, and myself.

Mr. WEISL. Of all those men, how many of them knew anything about missiles?

Mr. HOLADAY. Well, I am quite confident, or at least I hope I know something about missiles. I am sure that Mr. Quarles in his extensive experience knows something about missiles.

Senator JOHNSON. We hope so, too.

Mr. HOLADAY. Also, Secretary McElroy has become quite an expert on missiles. This goes on further to, of course, describe why these people were there as to their various backgrounds.

Mr. WEISL. So that we do not make Mr. McElroy's testimony unreliable, may I state that in his testimony he said he did not know the difference between the Thor and the Jupiter, when he testified here.

Mr. HOLADAY. As to the details that is probably correct.

Senator JOHNSON. You would not consider him an expert?

Mr. HOLADAY. I have attempted, Mr. Counsel, to give you the type of people that I have consulted with in the period of time in which I have very carefully studied the methods of manufacture, the test program, the methods for deployment, and the method of training. They all have been under very severe study since we set up the Jupiter-Thor committee.

Mr. WEISL. Have either one of the systems a trained crew to man them?

Mr. HOLADAY. No; not yet.

Senator SALTONSTALL. What was that question, please?

Senator JOHNSON. The counsel will please repeat the question.

Mr. WEISL. Have any of the systems a crew to man them; a trained crew to man them?

Senator JOHNSON. And the reply?

Mr. HOLADAY. The reply was "No."

INDIVIDUAL MEMBERS OF COMMITTEE WERE CONSULTED

Mr. WEISL. Did you consult the Ballistic Missiles Committee before you made that decision?

Mr. HOLADAY. The individual members. I did not call immediately the entire group.

Mr. WEISL. Who are the individual members?

Mr. HOLADAY. Myself, as chairman; Mr. McNeil; Dr. Foote, of Research and Engineering; McGuire of Supply and Logistics; Bryant, of Properties and Installations; and Dr. Reed of the Bureau of the Budget.

Mr. WEISL. Which one of these men are experts in the missile field?

Mr. HOLADAY. These are experts in their particular areas, as you well realize, to help supply a rounded position here as to money, manufacturing, and things of this type.

Mr. WEISL. Did they unanimously agree on the decision?

Mr. HOLADAY. Since I did not hold a——

Mr. WEISL. Did they individually agree?

Mr. HOLADAY. Yes, sir.

Mr. WEISL. Mr. McNeil agreed on the decision?

Mr. HOLADAY. Yes, sir.

Mr. WEISL. He is the Comptroller?

Mr. HOLADAY. Yes, sir.

Senator JOHNSON. There were no dissents?

Mr. HOLADAY. Not that I can recall.

Mr. WEISL. Did you consult the Joint Chiefs of Staff?

Mr. HOLADAY. The Joint Chiefs of Staff were studying several questions that we have before them at the present time in connection with employment. Some of this information was applicable to the decision, particularly that of the deployment at an early date of IRBM missiles.

Senator JOHNSON. The answer to his question is "Yes" or "No?"

Mr. HOLADAY. Yes.

Mr. WEISL. They were consulted?

Mr. HOLADAY. Yes.

Mr. WEISL. As to putting both of these missiles in production?

Mr. HOLADAY. Not specifically as to putting both of these into production. Their problem was on the method of deployment and the need for——

Mr. WEISL. Were they consulted specifically on putting both of them in production? In other words, did you call them and say, "We plan or we are considering putting both of these missiles in production. Here are the reasons why we are considering it. What is your judgment and advice that you have to use these missiles?"

Mr. HOLADAY. Sir, I specifically did talk to the Chief of Staff, the Chairman.

Senator JOHNSON. The Chairman?

Mr. HOLADAY. The Chairman.

Senator JOHNSON. That is General Twining?

Mr. HOLADAY. That is right.

GENERAL TWINING CONCURRED IN DECISION

Senator JOHNSON. And asked his recommendations?

Mr. HOLADAY. I discussed what the recommendation was that we were considering, to get his advice if he concurred in this recommendation.

Senator JOHNSON. And did he say that he thought that was a wise decision?

Mr. HOLADAY. Yes.

Senator JOHNSON. And did he concur?

Mr. HOLADAY. He concurred in our decision.

Senator JOHNSON. And you did not talk to the other Chiefs?

Mr. HOLADAY. No, sir. I personally did not.

Senator JOHNSON. Did anybody else that you know of?

Mr. HOLADAY. Not that I know of.

Senator JOHNSON. So, then, you did consult with the Chairman of the Joint Chiefs of Staff, told him what you were going to do, and asked him what he thought about it; and he said he concurred?

Mr. HOLADAY. Yes, sir.

Senator JOHNSON. Is that a fair statement?

Mr. HOLADAY. Yes, sir.

Senator JOHNSON. Thank you.

Mr. WEISL. Did you advise the Chairman of the Joint Chiefs who was, prior to becoming Chairman, the Chief of Staff of the Air Force, that the Air Force disagreed with the decision?

Mr. HOLADAY. No, sir.

Mr. WEISL. Have either of these systems been fully tested?

Senator JOHNSON. Let me see if I understand that question now.

You talked to General Twining and told him what your decision was going to be, but you did not tell him that the Air Force did not concur?

Mr. HOLADAY. No, sir.

Senator JOHNSON. You did not give him that information. Why?

Mr. HOLADAY. In previous conversations, sir, with General Twining going back to the time that we made the recommendation for continuing both programs, I had had a conversation with him as to why we were continuing with both programs, and I think he was well informed that the position taken by the two military members of my committee have been very strong for their own individual programs.

Senator JOHNSON. Do you think to have called it to his attention again would have been repetitious?

Mr. HOLADAY. Yes, sir.

Mr. WEISL. What you advised him was that both were in favor of continuing the testing and developing, not the manufacturing of both?

Mr. HOLADAY. In the previous conversations, the discussion was the fact that we had to continue the development program. We could not decide on one.

Mr. WEISL. But did you tell him, the chairman asked, whether the Air Force, of which he formerly was chief of staff, was opposed to the manufacturing or putting in production of both the systems?

Senator JOHNSON. I believe he has answered that. He said, no, he did not.

Mr. HOLADAY. I did not.

Senator JOHNSON. You did not think it was necessary to do that?

Mr. HOLADAY. No, sir.

SYSTEMS NOT FULLY TESTED

Mr. WEISL. Have either of these systems been fully tested as to guidance, propulsion, engine performance, and so forth?

Mr. HOLADAY. Speaking without too many details, because this is an open meeting, no, they have not. They have completed only about 10 percent of their research and development firing program based upon the number of missiles that have been launched compared to the total that is included in the research and development program.

Mr. WEISL. Can you give us an estimate, Mr. Holaday, of what it will cost the Nation to put both these systems in production at this time instead of continuing the development and choosing one or the other system?

Mr. HOLADAY. Again, I am in trouble on not mentioning dollars. But, sir, my best evaluation of this would be that the increased cost here is the cost of maintaining the R and D program on the second one.

Regardless of which way you go, you are maintaining rather than cutting off today that R and D program, which incidentally we could not do.

Mr. WEISL. I have not made myself clear, apparently, Mr. Holaday. No one objected in the services, as I understand it, to the continuation of the testing and development program. The only objection arose at this time to putting both programs, before they were fully tested and evaluated, into production at the same time.

And what I am asking you is, how much will the bill be to put both systems in production instead of putting one system in production after they are each tested fully?

Mr. HOLADAY. Sir, we have manufacturing facilities back of both of these missiles. One of them is more extensive than the other one, but those manufacturing facilities are in and are producing missiles now.

Mr. WEISL. May I help you out a little bit?

When you and I talked, you said at that time you thought the cost was around a hundred million, the extra cost.

Senator JOHNSON. The Secretary of Defense testified that it would be substantial, but he did not give an exact figure.

Mr. HOLADAY. I am trying to stay away from the exact dollars, Mr. Counsel, not because I would not like to disclose it, but I do not believe that it—

Mr. WEISL. Do you think it is a matter of security not to disclose it?

Mr. HOLADAY. That is right.

Mr. WEISL. Very well, we will discuss it, then, in closed session.

I think that about completes my questioning, Mr. Chairman.

Are there any answers that you would like to give, or would you like to clarify any of my questions, or did you misunderstand any of

them? Have you any suggestions to make? Have you anything to add to what has been said?

Mr. HOLADAY. You have kept me so busy, Mr. Counsel, I haven't had much time to think on the side.

Mr. WEISL. I hope I haven't overburdened or taxed you too much.

Mr. HOLADAY. No.

Mr. WEISL. I just felt it a duty to get out all the facts.

Mr. HOLADAY. I am used to it. I have enjoyed it.

Senator JOHNSON. Mr. Holaday, we appreciate very much the time you have given us this morning and your candid approach to the questions that have been propounded.

The committee will take a recess until 2:30. If it is convenient for you to return at that time, the members would like to ask some questions in their own right.

Mr. HOLADAY. Yes, sir; I would be glad to.

Senator JOHNSON. Thank you very much, Mr. Holaday.

The committee will take a recess until 2:30 o'clock this afternoon.

(Whereupon, at 1:15 p. m., the subcommittee recessed, to reconvene at 2:30 p. m., of the same day.)

AFTERNOON SESSION, 2:30 P. M.

Present: Senators Johnson (chairman), Kefauver, Stennis, Symington, Saltonstall, and Flanders.

Senator Bush from the Committee on Armed Services.

Also present: Senator John A. Carroll (Colorado).

Senator JOHNSON. The committee will come to order.

The committee will continue until late in the afternoon, perhaps 6:30, 6 or 6:30, and have a brief recess for dinner and then have an evening session.

I hope we may be able to conclude our work for the day by 10 o'clock this evening.

The staff will notify the Secretary of the Army and the other witnesses of our plan in order that they may be available when called.

We plan to have a session all day tomorrow.

If necessary we will run late into the evening, and we will meet on Monday and Tuesday.

Our plans beyond that date have not been formulated.

As soon as we can see what progress we have made in these 4 days, I will consult members of the committee and make a public announcement as to when additional hearings will be held.

Mr. Holaday, we thank you for your testimony this morning. We hope you have had an opportunity to rest and relax some from the questioning, and I am sure if we can get the questioning underway before the members get back we can finish with you perhaps in a short time. [Laughter.]

Mr. HOLADAY. Thank you.

SUGGESTIONS FOR SPEEDING UP LONG RANGE MISSILES PROGRAMS

Senator JOHNSON. Mr. Holaday, you are familiar with the IRBM and the ICBM targets of achievement which have been presented to this committee.

Now would you tell us in 1, 2, 3, or 4 steps what you think can be done to bring those targets closer to achievement?

Mr. HOLADAY. Basically at the present time, these programs are in the hands, of course, of the engineers. I am now speaking of the Jupiter, Thor, and Atlas programs.

It is a case of the engineers taking the thousands of various parts and making them work as a unit, so that no one part falls down.

The best thing, and about the only thing we can do, of course, is, on the psychological side, to influence these engineers to understand the importance of their job and the necessity of carrying it out, they do have to have the support—they did have to have the money to carry forward.

My feeling is that we do have this money support. The encouragement and necessity of these things, I think, are being well expressed to these engineers.

So in the form of getting the IRBM's and the ICBM's, the first step we have to get through is the engineering to complete that part of the program so that we have developed a reliable missile for production.

The second part after this is the need for the industrial part of our community to come into operation. This is one thing the United States has been outstanding on.

So after we complete our development this may call for some very unusual manufacturing to carry forward the actual production of these parts. It is not only the missile, it will be the ground support equipment and the preparation——

Senator JOHNSON. Would you elaborate some on what you mean by unusual manufacturing?

Mr. HOLADAY. Well, the unusual manufacturing capacity which this country can always do under stress and strain. We do not have to work 8 hours, 5 days a week.

It is a case then of getting the trained personnel to come in and operate the machines to produce and manufacture these parts.

So I am stating, sir, that if we can get our development work completed then their selected load is the industrial load of manufacturing these parts.

While we are manufacturing the training has to progress.

While the training schools are being built some men are going through the phase of plant training now. These will become the instructors in the training classes.

It is well on its way. I would say we have to hope for a successful development and then to put forward the money to actually produce.

Senator JOHNSON. How would you summarize for me, 1, 2, 3, 4, what steps you think we can take that will step up achievement dates?

Mr. HOLADAY. Well, sir, one of the things, I guess we will have to come back to you for is a supplemental on more money in order to keep these programs going in the accelerated——

Senator JOHNSON. Money is No. 1, that is fine.

Now, No. 2.

Mr. HOLADAY. No. 2——

Senator JOHNSON. I will get into the details with you a little later but now come on, I want to get 1, 2, 3, 4, summarized.

Mr. HOLADAY. No. 2, of course, to this is we have accelerated several programs.

Senator JOHNSON. I don't care about the history now. You tell me about what you think we can do now to accelerate these target dates.

What you have done is well and good. I will give you a fine grade on that.

Now, will you tell me what you recommend we do now?

Mr. HOLADAY. We will have to be sure that there are no bottlenecks in the research and development program.

I do not know that there are any but this is the part we have definitely to follow up very quickly if any bottleneck does come along, we must have the ability to move money, men into removing these bottlenecks.

Senator JOHNSON. All right.

No. 2, would be removing bottlenecks of which you are unaware?

Mr. HOLADAY. That is right.

Senator JOHNSON. All right.

Now come on and give me some more recommendations.

I want you to impress this committee with what you think could be done to accelerate this program.

Give us your program, you are the head man now.

What do you think can be done, 1, 2, 3, 4, to get going on missiles?

REVIEW OF MANUFACTURING SUPPORT UNDERWAY

Mr. HOLADAY. Well, the third one would be to review and be sure that our manufacturing support to produce these things is capable of producing them at the rate we would like to produce them.

We are reviewing this at the present time to see that the manufacturing facilities back of these programs are adequate to produce not only the missile but the ground-support equipment.

The next item that we are working on and must be carefully looked into is the acquiring of land and the preparation of bases on which these can be deployed.

Senator JOHNSON. The last one, the manufacturing support you have already done a part of that, I assume in eliminating restrictive limitations. As Secretary McElroy indicated he found bottlenecks in working hours and so forth?

Mr. HOLADAY. That is right.

We are, however, surveying the balancing out of those manufacturing items. To be sure we have enough parts in all cases to give us maximum manufacturing capacity.

Senator JOHNSON. All right.

Now elaborate a little bit on No. 4, acquiring land. What would you do there to accelerate that and how would you accelerate the target dates by acquiring land?

Mr. HOLADAY. Well, if we accelerate, as we have, the Atlas program, we will have to accelerate the manufacture and construction work on the bases so that the bases are completed and ready to be used when the missile systems are completed.

Senator JOHNSON. Do you have any other thought?

Mr. HOLADAY. Well, of course in connection with the IRBM's, we will need considerable aid and cooperation from our allies on the making of bases available to us in Europe for the deployment of these missiles.

Senator JOHNSON. Yes.

Mr. HOLADAY. That is the IRBM.

Senator JOHNSON. Do you have reason to believe that you won't have that cooperation—that that cooperation won't be forthcoming?

Mr. HOLADAY. I think, sir, there is cooperation, but not dealing with it lightly, the progress sometimes is quite slow.

Senator JOHNSON. I assume that is a matter that is going to be gone into pretty thoroughly pretty shortly.

Mr. HOLADAY. Yes, I believe so.

RESULTS OF THE ATLAS ICBM PROGRAM TO DATE

Senator JOHNSON. I believe you said that you had ordered an acceleration of the Atlas program.

Mr. HOLADAY. Yes, sir.

Senator JOHNSON. Has the Atlas been tested?

Mr. HOLADAY. The Atlas has had two attempts, there has been no successful flight of an Atlas missile.

I may have to take some time, if I may, sir, to explain. When we talk about putting into production, the lead times on missiles is that time between the time we start the various components and the time we complete the missiles runs 18 to 24 months.

So if we are going to accelerate production, you see we have to start ordering the parts, we have to start training the personnel that are going to manufacture them, and put them together so if we say tomorrow we are going to increase the production we don't go from 1 to 2 missiles the next day.

It is over a period of months that we can accelerate our production.

Senator JOHNSON. But you had 2 tests and 2 failures.

Mr. HOLADAY. On Atlas we have had two failures. Two tests and two failures, correct, sir.

Senator JOHNSON. Two tests, two failures.

How long have you been working on the Atlas?

How long has the Atlas program been going on?

Mr. HOLADAY. In its present configuration, it started in 1954.

Senator JOHNSON. That is in its present configuration.

When was the first contract given to Convair in connection with the Atlas?

Mr. HOLADAY. 19——

Senator JOHNSON. Speak a little louder, I have difficulty—I am a little hard of hearing.

Mr. HOLADAY. 1946 or 1947, I believe.

We can get this record for you.

(The statement requested is as follows:)

The Department of Defense subsequently stated that Air Force project MX-774, the forerunner of the Atlas development was initiated in April 1946.

Senator JOHNSON. When did you make your two tests?

Mr. HOLADAY. The two tests were made this past summer.

Senator JOHNSON. That is near enough.

Now you say you are going to accelerate the Atlas program.

Just tell us precisely how this is being done.

Mr. HOLADAY. Well, precisely what is being done here is the ordering of long-lead-time items under the hope or gamble that the development program will be successful.

Senator JOHNSON. Does that involve spending more money?

Mr. HOLADAY. This will involve obligating more money.

We will have to obligate, place orders for long-lead-time items, such as guidance packages, nose cones, engines and things of this type which are parts that have 18 months or more lead-time requirements.

Senator JOHNSON. Does it involve letting any more contracts, hiring any more men?

Mr. HOLADAY. Over a period of time; yes, there will be more men employed.

Senator JOHNSON. How else do you accelerate a program, what else do you do besides additional contract authority, ordering items ahead of time, how many more men will be involved?

Additional men.

Mr. HOLADAY. Well, in the manufacturing this would probably more than double the number of employees on the production line.

Senator JOHNSON. How many are there now?

Mr. HOLADAY. On Atlas?

Senator JOHNSON. Right.

Mr. HOLADAY. I don't have those exact numbers at my fingertip.

Senator JOHNSON. Approximately how many?

Mr. HOLADAY. I am questioning in my own mind whether we should disclose the number of men.

Senator JOHNSON. Very well. We will go into that in executive session.

Now you are sure there is a production line?

Mr. HOLADAY. There is production, yes, sir.

The missiles that are being used in the research and development program are being made on industrial manufacturing facilities.

TARGET DATES IN EARLY ATLAS PROGRAMS

Senator JOHNSON. Was there under the old program a target date for perfecting the Atlas?

Mr. HOLADAY. On the revised——

Senator JOHNSON. Under the old program?

Mr. HOLADAY. Starting back in 1946.

Senator JOHNSON. Yes.

Mr. HOLADAY. This is before my date.

The General remembers something about this but not the details.

Could I ask Mr. Waggoner if he remembers any of the details?

Senator JOHNSON. Just answer me if you had a target date. I assume you did and the answer would be "Yes," and then tell me what it was.

Mr. WAGGONER. The answer is "Yes," but the target date that was given in estimates in the early 1950's was about 1965 for the availability.

Senator JOHNSON. Has that date been materially changed under your acceleration order?

Mr. WAGGONER. Yes, materially so.

Senator JOHNSON. How many laboratories and contractors are now working on the Atlas?

Mr. HOLADAY. Well, the——

Senator JOHNSON. In other words, how many people are going to get orders under your acceleration designation?

Mr. HOLADAY. You will have Convair which is building the missile primarily itself.

They will have several subcontractors on the ground-support equipment which will be accelerated.

The guidance system will cause an acceleration, the nose cone will cause an acceleration, and the engines to be used will have to be accelerated.

Senator JOHNSON. So everything connected with it will in effect be accelerated?

Mr. HOLADAY. Yes, sir.

Senator JOHNSON. When did you make that decision to accelerate?

Mr. HOLADAY. The decision was made on December 2.

I looked it up at noon, on December 2, the decision was made to progress with this thing.

As I said, there was a verbal understanding on it, the letter formalizing it went forward either yesterday or today.

Senator JOHNSON. So on December 2 you and the Secretary decided you were going to step up the Atlas and yesterday you finalized it or formalized it?

Mr. HOLADAY. Yes.

Senator JOHNSON. Does the budget for next year ask for more money for the ICBM program?

Mr. HOLADAY. Yes, we will ask for a supplementary in 1958 and an increased amount in 1959 for the Atlas program.

Senator JOHNSON. Has that decision been finalized?

Mr. HOLADAY. As far as the Defense Department, yes, we have.

Senator JOHNSON. When was that decision made?

Mr. HOLADAY. At the same time we approved going ahead with the program.

Senator JOHNSON. I am not asking for a dollar figure, but how much in relation to what is being spent now? Is it considerable? Is the increase next year substantial in comparison to what is now being spent?

Mr. HOLADAY. It is not a great deal more in 1958. It goes up substantially in 1959 and it will go up quite substantially in 1960.

Senator JOHNSON. Will you say twice as much next year as spending this year?

Mr. HOLADAY. On Atlas alone, no, not twice as much.

Senator JOHNSON. Would you care to give us some just general speculative figure there?

Mr. HOLADAY. Approximately one-third increase.

Senator JOHNSON. Approximately one-third.

IS RESPECT FOR THE RUSSIAN CAPABILITY BEING TRANSLATED INTO ACTION?

Mr. Holaday, we all know that we underestimated the Russians on the H-bomb, and we underestimated them on the A-bomb. Now, is it likely, in your opinion, that we are underestimating them on missiles?

Mr. HOLADAY. Well, that is a very difficult question to answer.

Senator JOHNSON. Well, in the light of what has happened to us, would you not think that is a distinct possibility?

Mr. HOLADAY. Yes, I would say that is a distinct possibility; yes, sir, I agree with you.

■ Senator JOHNSON. And you are aware of that possibility and I assume you are drumming it into the heads of everybody around you and making your calculations accordingly?

Mr. HOLADAY. Yes, sir.

Senator JOHNSON. I understand that an early decision has been recommended in connection with the Titan, putting it into production status, and I understand that it is felt that can be done at a relatively minimum cost. Now, I want to ask you if you have seen that recommendation? I don't want to get into one of Dr. Hagen's things where it gets lost and nobody finds it until after the Russians get one in the air.

Are you familiar, first, with the recommendation that the Titan be put into a production status and an early decision be made in connection with that?

Mr. HOLADAY. I have certainly held many discussions with the Air Force along this particular line, sir. I know that this is, and some of the recommendations that have been proposed to us for accelerating the Titan program. We have flown no test vehicles whatsoever in connection with the Titan program. It is under consideration and study—the advantages and possibilities of advancing the program.

I would not like to discuss it much further in an open meeting as to the pros and cons. There are some very good points on either side.

Senator JOHNSON. You are familiar with the recommendation?

Mr. HOLADAY. Yes, sir.

Senator JOHNSON. You are familiar with the fact that it is contended that it can be put into a production status in production quantities with a relatively minimum risk, and you do not care to tell us publicly whether you agree with that recommendation or not?

Mr. HOLADAY. Well, you put minimum risk in there, since we have not flown any of them at all. The magnitude of that risk is something you have to use considerable judgment on.

We do have the manufacturing plant. It is being built with the manufacturing line to support it.

Senator JOHNSON. That is what I want. I want your judgment. I know what the manufacturer says about it. I know the recommendation which has been made about it and I want to be sure it has been made and I want to get your judgment in connection with it. I am trying to put it as simply as I can.

Mr. HOLADAY. My feeling is, since we have done no testing, that we should not proceed with this.

I do believe that it is one of our most promising missile systems. Therefore, I have a very definite interest in it. And the second we feel like we are on the beam, I certainly would be for recommending proceeding with it.

Senator JOHNSON. Can you make any suggestion as to how we can get on the beam?

Mr. HOLADAY. Well, getting on the beam here, consists of doing this research and development and we have not lacked on either facilities or money to complete the research and development. We will have to depend upon the engineering ability of those engineers who are doing this work.

Senator JOHNSON. You are familiar with the recommendation, and you anticipate that a decision will be made, but you are not prepared to indicate what that decision would be in the light of the information you have at this time?

Mr. HOLADAY. That is right.

Senator JOHNSON. You stated earlier in your testimony this morning, Mr. Holaday, that you had a consultation with the Chiefs of Staff. Now, does that mean that they advised you? Was this the advice of the Chairman of the Joint Chiefs or was it a committee type of decision?

Mr. HOLADAY. My conversation was with the Chairman of the Joint Chiefs of Staff. We propose and get the recommendations of the Joint Chiefs of Staff on many problems. We propose our problem and send it to the Joint Chiefs of Staff for their study and recommendations.

We have several papers before them at the present time asking for their advice and recommendations.

Senator JOHNSON. So when you want a formal recommendation from the Joint Chiefs of Staff, you get it in written form? When you consult, you consult with the Chairman of the Joint Chiefs?

Mr. HOLADAY. That is right. I meet in several meetings where the Chairman is present.

AIR FORCE DEPARTMENT OF ASTRONAUTICS

Senator JOHNSON. Will the new Department of Astronautics in the Air Force be under your jurisdiction?

Mr. HOLADAY. No, sir.

Senator JOHNSON. Did they kind of jump the gun on you a little bit yesterday, or what is this I have been seeing in the paper this morning?

Mr. HOLADAY. I concur in your statement. I think they jumped the gun. The new Director for Space is supposed to have responsibility for this within the Department of Defense. Therefore, I concur in your statement that the Air Force jumped the gun.

Senator JOHNSON. But it is not under your jurisdiction?

Mr. HOLADAY. No, sir.

Senator JOHNSON. Under Mr. Quarles' jurisdiction, I gather?

Mr. HOLADAY. At the present time we, that is my office, works very closely with Mr. Quarles; we are doing all the necessary work in this area, so that there will be no dropoff while waiting for the new plan to come. Our office does a large portion of this. Mr. Quarles has been somewhat of a coordinator on it.

Senator JOHNSON. How do you account for what happened in their jumping the gun?

Mr. HOLADAY. I cannot account for it since I turned down a notice—

Senator JOHNSON. How would you justify it? Maybe that is a better way to put it.

Mr. HOLADAY. Well, the only expression I can use here is apparently the Air Force wishes to show their ability in this and maybe see if they can grab the limelight and establish a position here before this new Director is set up in the Department of Defense. I cannot tell exactly what they are trying to do. Although you can look at it from this point of view. It is purely one of concentrating in this one area that work which they were doing now and that portion of the work which would be assigned to them under the new Director.

Senator SYMINGTON. Mr. Chairman, will the Chair yield? I was not quite sure I heard that. Could the reporter read back the answer. I want to be sure I heard him correctly.

Senator JOHNSON. Mr. Reporter, will you read back the last answer.

Senator SYMINGTON. The question that the Chair asked and the reply of the witness.

Senator JOHNSON. Mr. Reporter, will you please read that back?

Senator SYMINGTON. Thank you, Mr. Director.

Senator JOHNSON. You said you turned it down. I understood you to say a moment ago that you turned down something in connection with this. What did you turn down? Just tell the committee.

Mr. HOLADAY. There was only a release which comes to us and goes through our office in connection with releases of information. What I turned down was a proposed press release by the Air Force. I did this jointly with Mr. Quarles.

Senator JOHNSON. You turned down the release?

Mr. HOLADAY. Yes, they released—

Senator JOHNSON. But they just released it anyway?

Mr. HOLADAY. Well, I have not seen exactly what they did release. All I was dealing with here was a proposed newspaper release.

Senator JOHNSON. Is the Air Force superior to the Director for Guided Missiles and the Deputy Secretary of Defense, the Secretary of Defense? Do they proceed independently? You all say no announcement can be made and they jump the gun? By what authority did they override the decisions of you and Secretary Quarles and Secretary McElroy, if they have any authority to do so?

Mr. HOLADAY. I am not conscious that they did make a release.

Senator JOHNSON. I thought you said they jumped the gun.

Mr. HOLADAY. No; I said I concurred with you that they probably jumped the gun. I do not know that they have put out a release. I have not seen a release of the Air Force.

Senator JOHNSON. How did they jump the gun then?

Mr. HOLADAY. Sir?

Senator JOHNSON. In your view, how did they jump the gun?

Mr. HOLADAY. If what they have out in the newspapers is correct, something must have been either released or leaked to the newspapers, I am not sure. I haven't read it.

Senator JOHNSON. I agree with you. That is what you mean by saying they jumped the gun, by giving it to the newspapers when all of you had turned it down; that is what you mean?

Mr. HOLADAY. Yes.

SIX POINTS FOR ACCELERATION OF PROGRAM

Senator JOHNSON. Now, in the study which the committee staff made, wherein the committee has sought information from every conceivable source that we can think of, a brief summary was made this morning of the best advice available to us. In effect it finds that in six respects we could accelerate this program.

I might add to you, any man's judgment on any given question is no better than the information he has, and I think the information of all these people working on this program—first, the scientists we have had here, and the manufacturers and the contractors and the workers, the various scientific groups like Bell Laboratories, and so forth—I

think that the information they give us will help us to eventually make a sound judgment on the question.

We have our judgments to make, and we will make them in committee report and recommendations.

You have your judgments to make, and some you have to make today. I hope you will make judgments as I go over them with you.

Now, the first comment that they made was that the United States urgently needs to bring its missile-satellite-space program under an independent civilian commission. That is No. 1.

Do you agree?

Mr. HOLADAY. No, sir. At the present time, it would radically upset the program in all areas. I do not concur with that.

Senator JOHNSON. All right. But you would agree with modifications, I assume?

Mr. HOLADAY. To modifications of that; yes.

Senator JOHNSON. In what respect?

Mr. HOLADAY. One of them is the setting up in the Defense Department of this space and research work in the space and satellite field. I concur that this is the time. This is a new program and this is the area—

Senator JOHNSON. So your basic difference with that would be, you would make it dependent upon Defense instead of an independent civilian commission, independent of Defense; that is the basic difference?

Mr. HOLADAY. Yes, sir. And this is based partly on the fact that you cannot do development work in this area without being related to and with the military people in all this. It is quite a problem, and I concur we are better off where all these factors can have their effect.

Senator JOHNSON. You wouldn't go so far, under that theory, as to bring the Atomic Energy Commission over under Defense; would you?

Mr. HOLADAY. Not at this time; no, sir.

Senator JOHNSON. But would that not necessarily follow under your theory? They make some pretty important things over there.

Mr. HOLADAY. We have a military applications group that works very closely with the Atomic Energy Commission.

Senator JOHNSON. I am not barring you from having one to work very closely with this other independent commission. You could have one working very closely with them.

But I gather you think it undesirable.

Mr. HOLADAY. Yes, sir.

Senator JOHNSON. If it would be undesirable, why would it not be undesirable with Atomic Energy, as well, under your theory?

Mr. HOLADAY. Well, the Atomic Energy works only on one particular phase, as far as missiles are concerned, and that is the warhead.

Senator JOHNSON. That is right. That is not very important, either, is it?

Mr. HOLADAY. Yes, sir.

Senator JOHNSON. All right.

Mr. HOLADAY. Yes, it is very important.

A missile program is dealing with an entire missile system which has to be coordinated and worked into a military unit which is going to deploy it.

Senator JOHNSON. Then it is your testimony and your opinion that the Atomic Energy Commission can take care of the warheads all right as an independent civilian agency, but it would be disastrous to have an independent civilian agency attempt to handle the missile, satellite, and space program because you have got more parts to them? Is that a fair statement of your view?

Mr. HOLADAY. As of this time, yes, sir.

Senator JOHNSON. I do not want to belabor that point. I do not necessarily agree with you, but I want to see if I can finalize your conclusion on this recommendation, recommendation No. 1.

Is it fair to say you believe the United States urgently needs to bring its missile, satellite, and space program under one jurisdiction, under one head?

Mr. HOLADAY. In due course of time, that may be desirable. We are certainly moving in that direction now in setting up the space area. But if you attempted to move on all missiles at this time, that would cause considerable confusion and interruption.

It certainly is in a direction that we are planning to move, and I think we are moving in that direction.

Senator JOHNSON. Would your answer be any different if the commission was limited to space and satellites alone?

Mr. HOLADAY. If the new commission stayed only on space and satellites?

Senator JOHNSON. Yes.

Mr. HOLADAY. Well, it starts out, sir, on the space and satellite areas.

Senator JOHNSON. I say if we had an independent civilian commission that were limited only to space and satellites, and not missiles, would your answer be any different from the one you previously gave?

Mr. HOLADAY. No, sir.

Senator JOHNSON. So, then we can say that you believe we do need to bring our missile, satellite, and space program under one directing head with centralized authority?

Mr. HOLADAY. Yes, sir.

Senator JOHNSON. All right.

The only place you differ, then, is whether or not it is under the Defense Department or whether it is under an independent civilian agency?

Mr. HOLADAY. Yes, sir.

Senator JOHNSON. All right.

THE GAITHER REPORT

Now, when did you first read the Gaither report?

Mr. HOLADAY. I don't remember the exact date, but as I recall, it was some 3 or 4 days after it was presented to the President and the National Security Council.

Senator JOHNSON. Was it a somewhat voluminous report?

Mr. HOLADAY. No.

Senator JOHNSON. Did you read the report in its entirety yourself, or have it briefed for you?

Mr. HOLADAY. No, sir; I read it entirely.

Senator JOHNSON. How long is the report?

Mr. HOLADAY. I would estimate that it is in the neighborhood of a quarter of an inch thick.

Senator JOHNSON. How long did it take you to read it?

Mr. HOLADAY. I believe that my estimated time in reading and re-reading was in the neighborhood of 3 hours.

Senator JOHNSON. Were you startled by some of its conclusions?

Mr. HOLADAY. I don't believe so, since a number of my associates in the Pentagon had been working along with this group. I was fairly up to date as to the type of information and recommendations that was going to be made in the report.

Senator JOHNSON. Did you generally go along with those?

Mr. HOLADAY. Yes, sir, I think the recommendations are very sound and very good.

Senator JOHNSON. So you would embrace the recommendations in the report?

Mr. HOLADAY. Yes, sir. I don't know whether I can go as fast as some of them recommend we go, but in principle I concur in them.

Senator JOHNSON. It is a rather comprehensive report, well done, in your opinion?

Mr. HOLADAY. Yes, sir.

Senator SYMINGTON. Would the Chair yield for just one question there, for clarification?

Senator JOHNSON. Surely, Senator Symington.

Senator SYMINGTON. When you say "fast," do you mean fast in money or fast in effort?

Mr. HOLADAY. I would say fast in money and our ability to maybe move as fast as they indicate they think we should move in getting things accomplished.

This is a field here in which they think certain things can be done in a time period. In my own mind, I am doubtful whether we can do them quite that quick, sir.

Senator SYMINGTON. Thank you, Mr. Chairman.

Senator JOHNSON. Would the implementation contained in the Gaither report involve substantially increased expenditures on the part of the Congress?

Mr. HOLADAY. Yes, sir.

Senator JOHNSON. Would you be willing to indicate to us in what respects?

Mr. HOLADAY. Well, part of the recommendations that are within the Gaither report are being carried out by some of our accelerations in programs, and I don't know whether that is the answer to your question or whether I misunderstood your question.

Senator JOHNSON. I asked what subjects are covered by the Gaither report. I will put it this way and try to get at it from another angle.

You misunderstood it.

Mr. HOLADAY. I have talked in general terms about what was in the Gaither report, and apparently your question seems to be specific as to what is in the Gaither report.

Senator JOHNSON. What particular fields are covered by (a) and (b), in what particular fields are substantially increased appropriations needed?

Mr. HOLADAY. Sir, if I attempt to answer that question, we will have to go into closed session.

Senator JOHNSON. If the lawyer does not desire you to answer it, I will not press it. We will be glad to go into executive session. We were doing very well.

Mr. HOLADAY. I am trying to help as best I can.

Senator JOHNSON. I understand you are, and I appreciate it, and I compliment you.

Mr. HOLADAY. Thank you.

Senator JOHNSON. I want to yield to my lawyer here. [Laughter.]

All of us, I guess, could not live without lawyers, and this committee would be in bad shape if we did not have one, and I can understand the desire of counsel not to breach security. But I think you can be trusted pretty well in that respect.

Will you answer the question in executive session?

You can ask your lawyer if you want to.

Mr. HOLADAY. Well, I had better ask him. He came right up here and patted me on the head.

Senator JOHNSON. Give us the name of the lawyer.

Mr. DECHERT. My name, sir, is Robert Dechert. I am General Counsel to the Department of Defense.

In answer to your question, sir, we had to say that we did not have a copy of the report.

Senator JOHNSON. I would like to have Mr. Holaday answer it.

Mr. DECHERT. I thought you were asking me.

Senator JOHNSON. You can advise him. I understood him to say he wants advice from you.

Mr. HOLADAY. My counsel advises me this is the report to the President, and the President will have to release it.

Senator JOHNSON. I am not asking you to release it. But I am just asking you to give us your reaction to some of the things in it that you had done, and particularly the accelerated costs that would be required to implement it, and——

Mr. HOLADAY. In general terms, I am trying to be as helpful as possible——

Senator JOHNSON. I appreciate that.

Mr. HOLADAY (continuing). I think in executive session, in dealing with their recommendations in the guided missile area, if we didn't discuss specifically the details of it, I could more freely talk with you about what we have done in implementing it.

Senator JOHNSON. I think that is a fair and reasonable position to take, and I compliment you for it. If you will not spend too much time talking to lawyers, and talk to the committee, we will both profit from it.

We will go into executive session. I got the impression that everybody except the chairman and the committee knows what is in it. I cannot go outside the room without somebody telling me part of it. And since we are going to be concerned with it, I would like to have the top man in the missile field's general evaluation, and kind of tell me the specific areas covered.

I would like to have reliable information instead of all the hearsay and the stuff that is dropped under the rug.

Mr. HOLADAY. I concur with you 100 percent on that.

Senator JOHNSON. If you just will not change your opinion before we get into executive session, we will hear it.

The second recommendation that was made, and I want to get your views on this because I think you are striving to do everything

you can to help your country in this critical period, the second recommendation is: There is need for a permanent, competent and adequate staff in the Defense Department to provide leadership in basic and applied research.

RECOMMENDATION FOR STAFF TO SUPERVISE RESEARCH

Do you think the Defense Department does have need for a competent and adequate staff to provide leadership in basic and applied research?

Mr. HOLADAY. Well, this, of course, criticizes what we have at the present time in the research and development area, the Assistant Secretaries for Research and Development in the individual services. I think they have been doing quite a good job.

Senator JOHNSON. I am not asking you to criticize or justify them. I am asking you if there is need for a permanent, for a competent, for an adequate staff in the Department to provide leadership in applied and basic research. I would assume you would say "yes" or "no," "Yes, there is a need for it" or "No, there isn't."

Do you think it is adequate now, do you think it is competent now, do you think it is permanent now, and do you have all that is to be desired? I would gather you would then want to say, "No, I don't think there is any need for it. I think we have got the best in the world. We have got all we need. We are doing a good job," and so forth.

If you do not, I think you would need to say, "Yes."

The key word I want to point out to you is the adequacy of it. This whole Nation is up in arms wanting us to get on with missiles. Every place you go, every person you talk to, they are hungry for information, they are concerned that we are not doing all we can as fast as we can.

Now then, do you, as one of the top authorities in this field—I want to ask you if, in your opinion, you think your present staff is adequate?

Mr. HOLADAY. Well, of course I have to have considerable aid and assistance in all of this area, and to carry on and forward a research program, it makes it very difficult for me to answer you "yes" or "no."

Certainly we could stand some improvement or have more competent people added to us to help carry the program forward.

Senator JOHNSON. Do you think there is a need for that?

Mr. HOLADAY. Yes, sir.

Senator JOHNSON. That is the way I wanted you to answer, and I am glad you agree. I think there is need for it, and I think the results show a need for it, and I think the consensus is we have a need for it. And I am glad you agree we have a need for it, because I think you in your position can do more toward satisfying that need and supplying it than anyone else, with your recommendation and your requests.

I assure you as far as this one member of this committee is concerned, I am going to give you all the help you need to see you get not only a competent one, not only a permanent one, but, I emphasize, an adequate one, because we may not have a second chance.

Now, the third recommendation made is: The research and development program should be on a 3-to-5-year basis instead of an annual basis, so you can plan accordingly.

What is your comment on that? Do you agree?

Mr. HOLADAY. I think I very definitely have to agree with this, because research cannot be turned on and off. You can turn it off, but it is very hard to turn it on.

Senator JOHNSON. What I am pleased about is, here we have been going for 2 weeks, and I have talked to some of these people, and I have heard some of these reports, but I have been going from one part of the country to another; but here is a staff which has talked to roughly a hundred leaders in this field, and their recommendations sum up to 1, 2, 3, 4, 5. Now we are through with 3 of them, and you have had a modification of 1, but here you are in charge of this program, and you agree with what the general consensus of the top people in this country happens to be.

I want to take the fourth one: Contractors should have more leeway to make technical decisions, too much redtape, too much strait-jacketing—I guess by a Government supervising officer or supervising agents.

What is your opinion of that? Do you think it would be desirable for contractors to have more leeway in making technical decisions in this field?

Mr. HOLADAY. In certain areas, they have considerable freedom. In certain areas, I think they have not had their freedom.

There is certainly merit to that suggestion where people have not been able to move ahead with their own ideas and thoughts.

Senator JOHNSON. So you think that there is merit to the suggestion that contractors should have more leeway to make technical decisions because you are aware of certain areas where that leeway is necessary?

Mr. HOLADAY. That is true.

Senator JOHNSON. All right.

Let us take No. 5: Reduce the lead time by making early and firm decisions.

Mr. HOLADAY. Well—

Senator JOHNSON. Reduce the lead time by making early and firm decisions. I am not asking you to criticize somebody who preceded you or to compliment somebody who succeeds you. I am just asking you if you do not think it is highly desirable, in a program of this kind, that we make early decisions and they be firm so we know where we are going from here?

Mr. HOLADAY. This, being an industry man and looking at the program from where I sit, I would say, yes, this is true.

Senator JOHNSON. The answer is "Yes."

No. 6: Eliminate overtime restrictions.

I gather that has been done generally across the board wherever you found any need existed.

Mr. HOLADAY. That is right.

Senator JOHNSON. And you felt that at the time we met last time, December, that you did have to make that decision; it was a principal bottleneck, and the Secretary faced up to it and made it.

Mr. HOLADAY. That is right.

Senator JOHNSON. And you are getting satisfactory results?

Mr. HOLADAY. Yes, sir.

Senator JOHNSON. So you would agree, then, in effect, on all six of these recommendations, with the minor modification that you would not buy this new commission right now?

Mr. HOLADAY. Yes.

Senator JOHNSON. You might do it in a few months after you had tried one out?

Mr. HOLADAY. Yes, sir; I think that is true. Yes, sir.

SIX RECOMMENDATIONS WERE CONSENSUS

Senator BUSH. Mr. Chairman, will you yield for a question to the chairman?

Senator JOHNSON. Yes, sir; I yield.

Senator BUSH. Were these five points developed by the staff of this committee? Are we to understand that?

Senator JOHNSON. No.

Senator BUSH. Who developed those five points?

Senator JOHNSON. The staff talked to some hundred——

Senator BUSH. This is a consensus?

Senator JOHNSON. And from those groups, this morning they read a series of letters in which the Bell Laboratories made recommendations, the Naval Research group made recommendations, the General Dynamics and different ones made recommendations, and we summarized those recommendations.

It seems to be pretty general all through it, all of them were saying these things.

Here is the top man. I wanted to get his impressions. And the interesting thing to me and the satisfying thing, and I hope the satisfactory thing is that here the boss in Washington agrees with these people in the field that here is where improvement needs to be made. I hope that Mr. Holaday will give us his usual fine cooperation and take these suggestions and study them, and look for places where he can put them into effect wherever he thinks it is feasible and desirable and economical to do so.

And I am sure that is what he will do.

Mr. HOLADAY. Yes, sir.

Senator JOHNSON. Does that answer your question, Senator Bush?

Senator BUSH. Yes. Thank you, Mr. Chairman. I just want to make sure I understand it. This is a summary or a consensus?

Senator JOHNSON. That is correct.

Senator BUSH. Formed by our staff, of what they got out of these hundred inquiries?

Senator JOHNSON. Yes. I would say that you could probably take the hundred people they interviewed, and a hundred letters that were written confirming it, and could get 181½ recommendations; but 6 of them, practically all of them said.

And I summarized those six, and I wanted to ask his opinion of them. I could go into a great many others which will be submitted to him, because the letters are going to be submitted to him. We will probably put them in a report if we have a report. But right now, these are the six that stand out.

Senator BUSH. I thank the chairman for that information.

Senator JOHNSON. Mr. Holaday, since the Secretary had issued his order rescinding the restrictions on overtime in the ballistic missile program only 4 days prior to his testimony, did not fairness and the interests of full disclosure require all these facts be disclosed to the members of this committee, so they might not continue to labor under the impression there were no earlier restrictions on the use of overtime?

NO RESTRICTIONS ON R. AND D. TESTING PHASE

Mr. HOLADAY. The dates on taking off the restrictions on overtime are not all at one time. The letters which went forward at the time the overtime restrictions were put on, as I pointed out this morning, had a paragraph stating, if these restrictions slow up your development program or operational capability, you are to call it to our attention.

These were called to our attention at different times, so that the restrictions on various programs have gone off at different times.

I do want to point out again that we had no restriction on the research and development testing phase, which was the critical part and still is the critical part of our program.

Senator JOHNSON. But it did have on your production, or could have, an effect on it?

Mr. HOLADAY. Yes.

Senator JOHNSON. And production is an important part of your whole general picture at the moment, is it not?

Mr. HOLADAY. It will become more important when we finish up our development work.

Senator JOHNSON. It is important enough so that the Secretary thinks it is the greatest single bottleneck he has found.

Mr. HOLADAY. Yes, sir.

Senator JOHNSON. But it has been eliminated; is that correct?

Mr. HOLADAY. Yes, sir.

Senator JOHNSON. Would you please furnish for the record a copy of every decision, every directive, every order issued by the Department of Defense or by any of the military services during the calendar year 1957, affecting the use of overtime in the ballistic-missile program?

Mr. HOLADAY. I believe we have furnished that information.

Senator JOHNSON. Will you please check and see that that is in the record?

Mr. HOLADAY. Yes, sir.

(The information requested of Mr. Holaday is included in the classified records of the subcommittee.)

Senator JOHNSON. Do you have any recommendations before I conclude my examination that you would like to make to this committee as to how we can contribute constructively to expediting the missile program?

Mr. HOLADAY. I think we have covered most of the recommendations. I would again like to refer to those that Secretary McElroy used during the time that he was before the committee, and the fact that we have carried out quite a good many of those at the present time.

Senator JOHNSON. Do you agree with all those he made?

Mr. HOLADAY. Yes, sir. I have a copy —

Senator JOHNSON. I wonder if you would do this then. So I will not take too much of your time, and I apologize to my colleagues for taking so much. Would you supply for the record, in addition to what I have already asked, every order, every directive, a copy of every decision that you have made since our briefing at the Pentagon following the Sputnik II on Tuesday, tending to accelerate the program?

Mr. HOLADAY. Yes, sir. Nearly all of these will be classified.

(The information requested of Mr. Holaday is included in the classified records of the subcommittee.)

Senator JOHNSON. Yes. I do not know about that. I pick up the morning paper every morning and I see some statement about the Air Force. This morning it said they were doing something, and Mr. Quarles was kind of dragging his feet a little bit on it. But there is something every morning. They have got a good press outfit over there. If you will just get together all those decisions, I think that it would be of value to this committee and to the American people to show what action has taken place since Sputnik No. 2. If you will supply those for the record, I would appreciate it.

Mr. HOLADAY. I would just like to comment this one way. When I said some of them would be classified, they do have details on production rates and things of this type.

Senator JOHNSON. Sure. Anything that is classified, you can so indicate. I want as much of it in the record as I can because I think the country and the committee ought to know how you responded to this challenge of the dog up there going around 18,000 miles an hour, if we are doing anything about it and what we are doing. I think it would be good just to put in the chronological calendar in the record.

Mr. HOLADAY. I would be very glad to.

Senator JOHNSON. I want to thank you very much for your patience and your understanding of our problems, and I want to ask you this one final thing.

If you have a workweek that has limitations placed on it so far as your technicians are concerned, your scientists are concerned, all those seeking the answers are concerned—your engineers as I believe you put it a little while ago, if they are limited in their workweek to the point where they cannot get the answer—then those who must produce after we get the answer, their workweek is in effect limited to zero, is it not? It is a zero-hour workweek, is it not, because until you get the answer you cannot go ahead with the production?

Mr. HOLADAY. That is right.

Senator JOHNSON. So it is extremely important that with the limited number of men we have and the limited technicians we have and the limited scientists we have—although we think they are of the highest quality and I certainly do not want to underrate them and I think they have been kicked around too much and I think they are a dedicated group—it is extremely important that we provide every resource that they can adequately and economically and efficiently utilize, is it not?

Mr. HOLADAY. Yes, sir.

Senator JOHNSON. Because we have got to answer on production. If we find what we want to produce, and the answer to what we are going to produce, you have not the slightest doubt but what we can make them so fast they will be running out of our ears.

Mr. HOLADAY. That is right.

Senator JOHNSON. Thank you.

Senator SALTONSTALL. I want to thank you for your testimony and I appreciate your responses.

Senator JOHNSON. Senator Saltonstall.

Senator SALTONSTALL. Thank you, Mr. Chairman.

THE "SPACE GROUP"

Mr. Holaday, may I ask you just a few questions along three separate lines. You have been questioned by Senator Johnson on this space problem and is it my understanding that there is to be a separate group or separate committee set up to operate this space group as opposed to your group in the ballistic missiles?

Mr. HOLADAY. Yes, sir; it will be equivalent to a Director for Space, a spatial agency, and they will be assisted by having the money appropriated to them and they will carry on the research and development right in that group. It will be separate from our operation where the research and development and production is in the services, if I can draw that distinction.

Senator SALTONSTALL. Then you draw the distinction that the space group, the space problem is a problem that is not strictly a military problem?

Mr. HOLADAY. Of course, there are quite a good many very definite military problems, and there are, of course, the scientific parts of it. I do not think in any military problem that science is not of value to us. It very definitely is of value.

Senator SALTONSTALL. What I was getting at was this: As I understand it, the power to thrust the satellite up into the air is part of the problem that you have to thrust the ballistic missile up in the air; is it not?

Mr. HOLADAY. Yes, sir.

Senator SALTONSTALL. And I just wondered if you were not going to have a conflict between your two groups and perhaps misunderstandings, leading to competition and thus waste; that would be inadvisable?

Mr. HOLADAY. Well, I hope that is not the case. At least our planning, and our thinking is all on a coordinated and cooperative basis.

Certainly, if this group took off and developed its own engines and everything of this kind, it would be wasteful. The planning and thinking so far as I am concerned, and also Secretary McElroy, is that we will be a cooperative group, not fighting and will use the available material we have to help out in their program.

Senator SALTONSTALL. Now, is that a decision that has already been reached?

Mr. HOLADAY. Secretary McElroy announced that thing and said it would be operational as soon as a man was available to head it up.

Senator SALTONSTALL. Do you think it is going to accelerate the space problem research as well as the ballistic problem research to have them divided this way in two sections?

Mr. HOLADAY. Well, sir, I have to concur in this since I assisted in making the recommendation to the Secretary, I have to concur this is a very definite straightforward group.

WHY NOT CUT DOWN ON THE COMMITTEES?

Senator SALTONSTALL. Now, I listened with a great deal of interest this morning to the number of committees that you and Mr. Waggoner described. Why should not some of those committees be abolished? Are there not too many committees there now? If you are going to be the director of all this ballistic and guided missile research

and development, why should not you cut down on the number of committees?

Mr. HOLADAY. Well, sir, maybe I can try to defend each one of them. My advisory group on ballistic missiles, I need very definitely to keep me advised. It also acts as you well realize to overcome considerably this shortcoming in the exchange of information which was raised by certain of the companies. Understand that certain people serving on this Committee, come from industry. This helps to keep them advised as to what is going on and we get the best and broadest recommendation.

In the one on Vanguard, it is possible that this Committee will be eliminated, or in all probability modified after we finish the Vanguard problem. They will become advisory to the new Director of Space, so after we complete our Vanguard portion of the program, and the Space Section is set up, we would not have any further need for it.

Now, as to the Ballistic Missile Committee, as I pointed out, this is wrongly named; it is an action group rather than a committee. It has members within the Department of Defense to give quick action to decisions.

Now, one other group, I believe that was discussed this morning was the Coordinating Committee on Guided Missiles. That was in Research and Engineering; and since this activity has been moved to our office, in all probability this will be eliminated.

The Thor-Jupiter committee in all probability will also be eliminated if we continue as we are now going at the present time.

The panel on aeronautics is only indirectly advisory to us, they are in Research and Engineering and not in our office. We sit in on their meetings and take whatever advice they give to us.

The anti-ICBM committee has been doing excellent work up to the present time in coordinating information and pointing up the need for research and development that we need, and they also in turn may become part of the new office.

Does that help you, sir?

Senator SALTONSTALL. So with the present committees, 2 of them will be abolished and 2 others will be transferred to this new space group?

Mr. HOLADAY. That is right.

Senator SALTONSTALL. And you feel that all the others are advisable because it keeps industry informed of what you are doing and also permits you to work with industry better?

Mr. HOLADAY. Yes, sir. We have, of course, always had a very strong support from industry on our advisory committees as one of the very excellent means of communication and exchange of information.

RELATIONSHIP WITH DR. KILLIAN

Senator SALTONSTALL. As yet, you have not described entirely your relations with Dr. Killian, not on the ground of personal relations because I know they are cordial, and I know that they are cooperative. But assume that there were different personalities involved. Is there in your opinion a clear-cut line of authority between Killian and yourself?

Mr. HOLADAY. I do not believe, sir, that I have any difficulty in understanding this. He is of aid and assistance to us in expressing

his own personal views, the results from his own advisory committee, and in reverse, making it possible for us to get to the President, through him, our recommendations and considerations.

I see no difficulty here whatsoever.

Senator SALTONSTALL. Well, if he and you, if Dr. Killian reached one conclusion and you reached another conclusion, that problem would have to go to the President.

Mr. HOLADAY. I imagine it would, yes, certainly, because Dr. Killian works for the President. I think the President would have to resolve it.

Senator SALTONSTALL. In other words, then, neither Dr. Killian nor you are superior one to the other in the line of authority?

Mr. HOLADAY. No. I never considered it that way. I have considered him more on a par with me, being in the President's Office, however, instead of in the line of command.

Senator SALTONSTALL. And he could not overrule any of your decisions, certainly, without the authority of the President?

Mr. HOLADAY. I believe that is my understanding, sir.

Senator SALTONSTALL. Another point was not entirely clear to me this morning, perhaps because I have been on the Appropriations Committee a number of years. When you used this word "available" to the counsel, available funds, it was not quite clear to me that what you said agreed with my understanding of the statutes and the budgetary authority.

Let me put it this way: It is my understanding that when Congress makes an appropriation, we will say, of a million dollars for research, that goes to the Budget Director. That does not become available to the Department of Defense or to the Air Force, the Army, the Navy, until the Budget Director releases it to the Comptroller of the Department of Defense. The Comptroller of the Department of Defense takes that money and he determines when it shall be released to the three services or to the Department of Defense—or to the research efforts, we will say, of the Defense Department.

Now, when it becomes available to the research of the Defense Department or of the services, then it can be used and contracted for. Now, do you agree with that understanding?

Mr. HOLADAY. Yes, you are the expert in this and that is my understanding of the way it works, yes, sir.

Senator SALTONSTALL. So that when you say that you have control of all the available funds, you mean the funds that have gone through those processes and have reached your desk or reached the desk of the various services?

Mr. HOLADAY. That was what I was working on; once the money becomes available to us, we freeze it for our programs.

Senator SALTONSTALL. Now, do you, as Director of Guided Missiles, have the power to allocate the funds to the various services to particular missile projects?

Mr. HOLADAY. I will have to apologize to you, Senator Saltonstall, I was trying to read and listen and unfortunately I cannot do both. Will you ask your question over again? I am sorry.

Senator SALTONSTALL. Do you, as Director of Guided Missiles, have the power to allocate the funds of the various services to particular missile projects?

In other words, as overall Director with the authority that Mr. McElroy has given you, can you say to the Air Force or to the Navy,

"You shall use funds allocated to the Air Force or to the Navy for specific missile projects."

Mr. HOLADAY. If I understand you, we approve that expenditure of money or disapprove that expenditure of money.

I am afraid I am not following you because you are too much of an expert in this money area, sir, I am sorry I can't follow you completely, sir.

CAN DIRECT INITIATION OR CANCELLATION OF PROJECTS

Senator SALTONSTALL. Let me put the question in another way.

Can you direct the Secretary of the services to either initiate or cancel a particular missile project?

Mr. HOLADAY. This is my understanding of my authority. I certainly would not do this without lots of counsel with the Secretary and so on. But when the time comes to cancel or approve or to expand, I have to assume this responsibility and do it; yes, sir.

Senator SALTONSTALL. So that when we, as the Members of Congress, appropriate a billion dollars, we will say specifically to the Department of the Air Force (for research), you can direct where that money shall be spent.

Mr. HOLADAY. Yes, sir.

Senator SALTONSTALL. Is it possible for the services to act independently of your office either as to the initiation of a new missile project or the amount of financial support which a service might wish to commit to an existing missile project?

In other words, can they act independently of you or under your directive now, do you assume all responsibility for determining what they shall initiate, what they shall reject and what they cannot go outside of?

Mr. HOLADAY. Well, sir, this has been the method in the ballistic missile area in which we have worked.

This is the method which we plan to work on all missiles in the future. That is how the program will be approved, and how the amount of money to go with it will be approved. And once approved, they therefore proceed down their program.

Only in case they try to make any modifications or changes they must come in for an approval or modification of their program.

Senator SALTONSTALL. Has the Secretary of Defense given you responsibility over his discretionary fund insofar as it applies to missile projects?

Mr. HOLADAY. You are talking about his emergency money?

Senator SALTONSTALL. Yes. He has \$80 million if my memory is correct with a \$50 million additional transfer authority.

Mr. HOLADAY. No, I would have to make a recommendation to him, sir, for the use of that money.

And incidentally, I have made some recommendations and used some money.

Senator SALTONSTALL. The directive by Mr. McElroy, which he has given to you, and which you read this morning, has increased, in your opinion, your authority over what it was as the Assistant to the Secretary of Defense for Guided Missiles.

In other words, you have got more authority since that directive than you had before.

Mr. HOLADAY. Yes, sir.

ANTIMISSILE MISSILE, SATELLITES AND SPACE VEHICLES NOT UNDER HIS JURISDICTION

Senator SALTONSTALL. Will you have authority over the antimissile missile program, satellites and space vehicles or will these come under the jurisdiction of the proposed Advanced Research Projects Agency?

Mr. HOLADAY. They will come under the other Agency and will not be under my supervision.

Senator SALTONSTALL. So the other Agency will have the space program and the others.

Mr. HOLADAY. The satellites, space platform, and antimissile missiles.

Senator SALTONSTALL. Was there another program there?

Mr. HOLADAY. No. I think we must keep it clear, sir, that the research and development part of the antimissile program will be over in the other Agency.

Once we decide that we are proceeding with a weapons system, this will then be assigned back to a military service and will come back into our office. When the service really gets down to the building of hardware and in the building of the equipment to make an antimissile missile system, this will come back into our office.

The research and development is in the new area.

Senator SALTONSTALL. Mr. Holaday, if I might make a comment, this is not a question, but it is a comment—as one Member of Congress, I would hope that you and Mr. McElroy would look very carefully into the development of this new agency because it seem to me that in creating new agencies in this field, speaking as a laymans, that you are going to run into some more conflicts and perhaps some more contrary decisions that will lead to slower action.

That is a comment, not a question to you.

Now I may be wrong in that.

Would you have any comment on that?

Mr. HOLADAY. No; I don't believe so—we are still studying the new organization and its methods of operation.

We have almost daily conversation on this subject, and we will very definitely keep in mind your point, as we have in the past, about whether that should be separated from our office.

These have all been parts of our discussions, sir, and we are still flexible in the final decision as to how and what will be in this unit and exactly how it will operate.

We are taking the best counsel and advice we can get at this time in getting the organization put together so it can be efficient.

Senator STENNIS. Excuse me. Just a moment.

The Chair is in doubt as to what has become of the 10-minute rule. The Chair would like to advise with the committee as to what the pleasure of the committee is.

The chairman took some extra time. I am not inclined to try to enforce the rule abruptly but I think in deference to those further down the list something ought to be done about it. What is the pleasure of the committee, and what is the pleasure of the Senator from Massachusetts first?

Senator SALTONSTALL. Mr. Chairman, as your comment was obviously aimed at the Senator from Massachusetts, I would say I was following along the lines of the chairman.

I have three more very simple, brief questions. I have been 17 minutes, I think by the clock. And I will hold back those questions or I will ask them now.

They are very quick, very simple and then, as far as I know, I am through.

Senator STENNIS. Well, the Chair is inclined to recognize the Senator for the 3 questions and we will convert the 10-minute rule into a 15-minute rule and then start over; is that all right?

Senator SYMINGTON. Will the Chair yield, as long as the Chair brought that question up.

I started interrogating Secretary McElroy at 20 minutes of 6. At 6:30 they called it off and at 11:30 they said they would bring him back in again if we wanted to question him.

I started questioning Secretary Quarles at 20 minutes of 11, and finished at 11:30 after making the rounds on the basis of the 10-minute rule.

I would hope we could work it out as we do in other committees that I am a member of so that the low people on the totem pole like myself have some time to question the witnesses during normal hours. I thank the chairman.

Senator STENNIS. The present occupant of the Chair yielded his time.

Let's make this a 15-minute rule with special recognition to the Senator from Massachusetts.

Senator SALTONSTALL. Thank you, Mr. Chairman.

Changing the subject, do you stand by your speech of December 5 as you gave it?

Mr. HOLADAY. Yes, sir.

HIS IDEA WAS TO STIMULATE PEOPLE

Senator SALTONSTALL. And that speech, in your opinion, was a stimulating speech and not in any way a speech of complacency or a speech that might give an impression of complacency to people of America?

Mr. HOLADAY. I wrote it in the face of trying to stimulate people to move, not to be complacent; yes, sir; and I stand by it.

Senator SALTONSTALL. Now, the counsel brought out a great many criticisms of difference of opinion, based on differences of opinion between military research groups such as the Naval Institute and some civilian research groups.

You have been in the research business all your life.

Did you ever see a time when the civilian research groups and the military research groups were in entire accord?

Mr. HOLADAY. No, sir.

Senator SALTONSTALL. And they never will be, will they?

Mr. HOLADAY. We can hope for that but I am afraid they never will be.

Senator SALTONSTALL. Just one final question.

Do you conceive it to be your job to knock out the bottlenecks wherever they occur, in research and development or in the operational stage of ballistic missiles?

Mr. HOLADAY. Yes, sir.

Senator SALTONSTALL. And you are going to do everything you can to knock those bottlenecks out and accelerate the program?

Mr. HOLADAY. Yes, sir; I hope we have taken out a good many of them already and we will continue our efforts along those lines.

Senator SALTONSTALL. Thank you, sir.

Senator STENNIS. I thank the Senator from Massachusetts. The Senator from Tennessee, Mr. Kefauver.

Senator KEFAUVER. Thank you, Mr. Chairman, and when I get to 10 minutes, I wish the Chair would let me know.

Senator STENNIS. Yes.

Senator KEFAUVER. Mr. Holaday, I have been very much impressed with your sincerity and with your great desire to get this program going.

I know that you are a good man and that you should have your part in the program, but I must say I know it takes time to get these lines of command straightened out and settled and it is such a complicated matter that it is still a lot of confusion to me as to who is going to do what and what you are responsible for and who has the final say-so about these matters.

DELINEATION OF MR. HOLADAY'S AUTHORITY

Do you consider this as a scientific or administrative position?

Mr. HOLADAY. Administrative.

Senator KEFAUVER. Have you been trained in administrative positions?

Mr. HOLADAY. Yes, sir.

Senator KEFAUVER. Where?

Mr. HOLADAY. A large portion of my experience has been in the administration of research and engineering work.

Senator KEFAUVER. In reading over the directive to you by the Department of Defense, the first part, upon the responsibility and authority, the Director of Guided Missiles will direct all activities in the Department as related to research and development, engineering, and production of guided missiles.

That is a rather broad and substantial authority.

Then it seems to me that the second two points cut down on your responsibility and your authority. That you will report directly to the Secretary of Defense.

So, are your actions, the decisions you make, the orders that you give the Secretaries of the Army, the Navy, and the Air Force all subject to review and change by the Secretary of Defense or do you have the final say-so yourself?

Mr. HOLADAY. I think it is only fair to say that in my understanding of it the Secretary of Defense has the power to overrule me.

As I explained this morning, after we have established our policy, I proceed, and in line with good organization, I think he has the power to overrule me, if he is not satisfied with my decisions.

Senator KEFAUVER. So what this comes down to is that you are really the executive assistant for the missile program. Is that the way it finally works out?

Mr. HOLADAY. Well, I don't know just what you mean by that term.

Senator KEFAUVER. Well, I really feel, sir, that all of this missile, satellites, space and research and development for military and non-

military purposes ought to be under somebody directly who has the final say-so about it.

I have been impressed with the idea of a separate Cabinet position eventually. I know you cannot unscramble eggs that are already scrambled.

But what I am trying to find out is, are you responsible or is the Secretary of Defense responsible?

Mr. HOLADAY. Well, certainly, sir, with the power which I have, I proceed after we have established a policy, and that authority of course will only last so long as the Secretary and I understand each other and we work in the interest of moving ahead.

I would become quite discouraged, I feel, if the Secretary started overruling me.

Senator KEFAUVER. In other words, as long as he agrees with you or you reach a meeting of the minds, why, then, well and good, but if he has one opinion and you have another opinion, his opinion will prevail; is that correct?

Mr. HOLADAY. Yes, sir.

Senator KEFAUVER. You have authority over missiles, you have authority, did you say, to direct the Secretary of the Army, Navy, and the Air Force what to do and what not to do, to cause them to inaugurate programs, to stop programs, as you desire it in this missile field.

Mr. HOLADAY. Yes, sir.

Senator KEFAUVER. Is that subject to review or to change by the Secretary of Defense?

Mr. HOLADAY. Yes, sir.

Senator KEFAUVER. And you have this authority over missiles but you said the basis for launching them, this didn't come under your jurisdiction?

Mr. HOLADAY. I beg your pardon?

Senator KEFAUVER. The bases for launching missiles did not come under your jurisdiction?

Mr. HOLADAY. That is right.

Mr. WEISL. They did not?

Mr. HOLADAY. The working of the base, the training, the ground support equipment, and the missiles into an entire patter is all in my area of responsibility.

Now where the base is located, and the method of deployment and launching of a missile is a military decision.

Senator KEFAUVER. And does not come under your direction and jurisdiction?

Mr. HOLADAY. I am not an expert in fighting the war.

LOCATION OF BASES A MILITARY DECISION

Senator KEFAUVER. I mean, somebody has got to have a say-so about the bases. Do you or do you not have a say-so?

Mr. HOLADAY. I have a say-so in seeing that the base and missile fit together.

But where the base is located, in what part of the world it is located, is a military decision and the method by which the missiles will be deployed is a military decision.

Senator KEFAUVER. Now, the second limitation in the directive is that you use the personnel and certain staff and appropriate staff members.

So you are limited by the personnel that are set up by somebody else.

In other words, you don't have direction over the personnel, the manpower that will work on these programs.

Mr. HOLADAY. No, sir.

Senator KEFAUVER. I could not get clear whether you had the right of allocating funds or whether that was the Secretary of Defense's responsibility or the Comptroller's responsibility. That is, if certain funds are available you can allocate so much for this and so much for that. Is that your responsibility or whose is it?

Mr. HOLADAY. As the money that is appropriated for a missile program, as it has been in the past for ballistic missiles, moves into the Department of Defense, we freeze that amount of money and we approve the expenditures of those funds, the programs and the expenditures of those funds.

Senator KEFAUVER. Is your say-so final or who has the final voice in that matter?

Mr. HOLADAY. Sir, this can probably be, in effect, the Bureau of the Budget who might say that he was not going along with that expenditure of money. In this particular case I would have to take this to the President to have it resolved. If it happened to be within our own office, in which Mr. McNeil would raise a question as to the moving of money over, I would have to take that before the Secretary of Defense to have it resolved.

Senator KEFAUVER. Well, in other words, you do not have the final authority, as I understand it.

Mr. HOLADAY. That is right.

Senator KEFAUVER. What is your relationship, Mr. Holaday, with Dr. Foote, the Assistant Secretary for Research and Engineering? Can you give him orders, tell him what to do, or just how do you work out matters with him?

Mr. HOLADAY. No, sir. That is purely a coordinating job. I do not give Dr. Foote any orders. They carry on, as you well realize, a lot of the research work, so we work very closely in this area, and I use quite a good many people on his staff to assist us in our program.

Senator KEFAUVER. So that is a cooperative arrangement, and you are not his boss and he is not yours, as I understand it.

Mr. HOLADAY. That is right.

Senator KEFAUVER. Both are responsible to the Secretary of Defense.

Mr. HOLADAY. Yes, sir.

Senator KEFAUVER. Then I think Senator Saltonstall pointed out something that I know I am also worried about, and that is, I take it the Defense Department is primarily concerned with research and development that has to do with the making of weapons. What are we going to do about these programs in which there is no immediate relationship to weapons?

In other words, well, the space program, that is going to be a separate department in the Defense Department on a co-equal basis with you? Is that what I understand you to say?

Mr. HOLADAY. Yes, sir.

Senator KEFAUVER. And do you have lines of demarcation clearly set as to what part of the matter you handle and what part they will handle?

Mr. HOLADAY. No. This has not been clearly defined.

Senator KEFAUVER. It is going to have to be, is it not?

Mr. HOLADAY. Yes, sir.

Senator KEFAUVER. Then how about these scientific developments which are purely scientific, which have no immediate military significance, such as the weather and the study of cosmic rays, things that Dr. Teller talked with us about? Is that going to come under you, or under whose supervision will that be?

WEATHER CONTROL RESEARCH UNDER NEW AGENCY

Mr. HOLADAY. Of course, weather has always been worked on to a great extent by the services themselves. A lot of the scientific program will continue in the space area, reconnaissance satellites, and things of that type, will be in the space-satellite area.

Does that answer your question?

Senator KEFAUVER. You mean it will come under this new agency that is going to be established?

Mr. HOLADAY. Yes, sir.

Senator KEFAUVER. Is that correct?

Mr. HOLADAY. Yes, sir.

Senator KEFAUVER. I just want to say, Mr. Holaday, that I think by airing these matters out here and asking questions, it may eliminate some of the confusion, and maybe you, the President, or someone could get down to making clear lines of demarcation.

But it does seem to me that there is still a whole lot of confusion as to who is going to do what, and who is responsible for what, and who you report to, and just how much authority you have.

Do you not feel that there still are some unsettled matters, and many of them, in your job?

Mr. HOLADAY. Sir, I will have to agree with you. I have tried the best I can to help you.

Senator KEFAUVER. I know, and I know you are doing the best you can. But I do feel, though, it is going to take a whole lot of aggressiveness to get the kind of authority that you are going to have to have to get this job done, Mr. Holaday.

Mr. HOLADAY. Fortunately, I have had wonderful cooperation from all of the people that are helping me, and I certainly need lots of help.

If that cooperation would discontinue, I would be in trouble.

Senator KEFAUVER. Thank you, Mr. Chairman.

Senator STENNIS. I thank the Senator from Tennessee.

Secretary Flanders, you are next.

Senator FLANDERS. Yes, sir. Thank you, I am not a Secretary. I am a Senator.

Senator STENNIS. You are qualified to be both in one.

Senator FLANDERS. I hope that is not taken off my time.

Senator STENNIS. I will give you Cabinet rank any time you wish.

Senator FLANDERS. Thank you.

ANALOGY BETWEEN LAUNCHING MISSILES AND LAUNCHING SATELLITES

Mr. Holaday, is it proper to suggest or to think of launching a missile, launching a warhead, and launching a satellite, as being about the same problem? One missile, if you want to call it, contains a warhead, and another of somewhat the same characteristics carries a satellite?

Mr. HOLADAY. They certainly are within the same field of technical accomplishment. The techniques and approaches are somewhat different.

We have to have high accuracy in both of them, and we have to have launching power to lift into the outer atmosphere either the ballistic missile warhead or the satellite, so they are quite comparable in that sense.

Senator FLANDERS. I asked this question because I am a little bit disturbed about this separation of powers and duties. I am afraid that a new organization will start out and have a missile structure of its own, and that then we will have instead of the example of Thor and Jupiter or Titan and Atlas, we will have a third. We will have three of them. I wish they had kept it within your jurisdiction, because it seems to me that it lies within your sphere of competence and activity.

I just make that as a statement. I do not ask you to answer it as a question.

Mr. HOLADAY. Thank you. I appreciate not having to answer it.

Senator FLANDERS. Assuming that the Air Force succeeds in retaining this new activity, would it be a good guess to guess that it would go to Ramo-Wooldridge?

Mr. HOLADAY. Sir, I would like to elaborate, if the chairman will agree to let you have a little extra time here in trying to answer that question, because in setting up this new agency I think we must understand that this new agency is not just going to grab every project away from any service that has carried forward research and development in this area, grab it away and pull it back in and say "You stop."

In carrying this work on, without any doubt the Air Force is well along in certain areas here. I am sure the new director that comes in in this area is going to coordinate, cooperate, and use the work and the effort that the Air Force has put into this field. This will become part of his field, but the money for supporting and doing it, he will have to supply, instead of the Air Force having to take it away from missiles or bombers or what have you.

So what I am saying here, in trying to help you out on it, we will use this method and technique. It has been done before. Whether Ramo-Wooldridge would be the advisers on it, I would say probably not because this man would have his own technical staff and he would be the technical adviser.

Senator FLANDERS. Thank you.

Now, Mr. Chairman, I would like to, if you think it proper, ask Mr. Holaday if he will provide for the committee a list of both guided and ballistic missiles defining their missions and present status of each in each service, and also give the prime contractors for each. I think it would be useful for us to have that before us.

Senator STENNIS. Very well. You want that supplied for the record?

Senator FLANDERS. Supplied for the record, yes. I do not expect you to give it offhand through the ear because that is something that needs to be seen by the eye.

Mr. HOLADAY. I wanted to point out, we are preparing a report which will be ready in about a week's time that will be quite complete, and I believe answer all your questions. So if I can have your questions, we will see that this report contains it.

Senator FLANDERS. And I would hope that it could be summarized in tabulated form so that we could see the whole thing at a brief inspection.

Mr. HOLADAY. Yes; I understand that. We will do that.

(The information requested of Mr. Holaday is included in the classified records of the subcommittee.)

Senator FLANDERS. I now want to ask you a technical question which I did not get satisfactorily answered out in Los Angeles, and so I come to the source of all wisdom, Washington, to ask the question.

What is the difference between guidance mechanisms in the missile and their controlling mechanisms? I gather that they are not the same thing.

Mr. HOLADAY. The guidance mechanism is the brains or the pilot which operates the controls. That is the shortest answer I can give you, sir.

Senator FLANDERS. I see. The guidance is the boss and the controls is the hired man?

Mr. HOLADAY. Yes, sir.

NOSE CONE PROTECTS SATELLITE UPON REENTRY INTO ATMOSPHERE

Senator FLANDERS. Now, the nose cone is simply the mechanism for setting off the warhead, the warhead and the mechanism for setting it off at the proper altitude and the proper time?

Mr. HOLADAY. No, sir. I believe we had better understand each other a little bit better here. When we talk about nose cones, we are talking about the protective material that is around the warhead?

Senator FLANDERS. Yes?

Mr. HOLADAY. To protect it on its reentry into the atmosphere.

Senator FLANDERS. It is a matter of protecting, simply of protecting the charge on reentry?

Mr. HOLADAY. Yes, sir.

Senator FLANDERS. I want to ask a couple of questions, Mr. Chairman, with relation to the short supply of scientists and engineers. When we hear testimony or when we see charts with regard to the organization of this undertaking in the Department of Defense, it looks to us terrifically complicated, and we have complicated it within the last 2 days by adding this new body concerned with the upper atmosphere.

To what extent in your observation and experience are first-class scientists and engineers short circuited or pocketed in this vast organization where they perform duties of coordination or duties of administration instead of working at the jobs for which they have been trained and for which they are eminently suited? Is there good use of our present existing engineering and scientific manpower?

Mr. HOLADAY. Sir, I do not believe it is perfect, again referring to my speech which I gave in New York. I approach this comment by

asking industry people to use 1 engineer to do the work of 2, or 1 engineer to do the work of 1, instead of 2 engineers to do the work of 1. I have a feeling that we are not using our technical people to the complete efficiency that they should be used. This is a very difficult thing to get ahold of, however. It gets down in all levels of management, and I think that people are doing a better and better job of it all the time to try and use these technical people to greater advantage.

DISADVANTAGEOUS USE OF SCIENTIFIC TALENT

Senator FLANDERS. Mr. Chairman, and our counsel, I would like to have this question raised with our outside sources of information as to whether they feel sufficient use is being made inside the Defense Department of scientists and engineers. Now, I have one other question to raise for the record, but not for you to answer, sir, because here you have no responsibility.

From time to time we see in the newspapers—and there was a time about a month ago of a particularly outrageous case—of a very highly competent mathematician who was doing some menial job as a non-commissioned officer, and finally—his record and his abilities were all on the punched card. I do not know whether the machine failed to pop him up or whether somebody looked at that card and misinterpreted the result from it or what. But I have the suspicion that there is an immense amount of inefficiently used ability in the Armed Forces of the United States, of which from time to time we get an example. I want simply, Mr. Chairman, to open this up at the present time as something which we may impress on the armed services to investigate, and in which I am sure they can do a better job. Thank you, Mr. Chairman.

Senator STENNIS. I thank the Senator from Vermont, too.

Mr. Holaday, you have been on the stand now almost 2 hours. Would you like to have a 5-minute break?

Mr. HOLADAY. No, sir, I would just as soon go right ahead.

Senator STENNIS. The vice chairman is next on the list here and he wants to open his 15 minutes by saying to the Senator from Massachusetts that his questions were very valuable a while ago and it was only in deference to Senators who are further on the list that I interrupted him. Certainly there was no defect in the quality and helpfulness of his questions. If he had special points further he would like to make now and felt cut off, I would be glad to yield him half of my time, half of the 15 minutes.

Senator SALTONSTALL. Mr. Chairman, after that courteous remark, my mind is a blank.

Senator STENNIS. Mr. Holaday, I have been impressed with your testimony and you have an impressive biography here. You are primarily an engineer, is that correct?

Mr. HOLADAY. I graduated from an engineering school, yes, sir.

Senator STENNIS. And you have had engineering and administrative experience of course, and now more recently, research. That is your background of your life's work.

Mr. HOLADAY. I started in with research followed by combined research and engineering.

Senator STENNIS. Just what is your present title?

Mr. HOLADAY. Director for Guided Missiles.

Senator STENNIS. Director for Guided Missiles. I think one major thing this committee and the people want to know is just who is in charge of this missile program. Even though you are named Director, I believe you said a while ago that should a matter arise in conflict with the position of Dr. Foote, who is the Assistant Director for Research and Engineering, that you would not have any authority over him; is that correct?

Mr. HOLADAY. Well, if the work in his office was in the area of guided missiles, research work, I would say yes, we have direction over him. But in the other areas in which he is working, which are many, I would have no authority over him.

Senator STENNIS. That clears the point up then. On matters pertaining to your work in the guided missile area, you would have superior authority. Now, if you should want to take a certain step, though, and if the Secretary of Defense did not agree with you, I mean a step on your missile program of which you are Director, and the Secretary of Defense did not agree with you—you would be cut off or blocked off there, would you not?

Mr. HOLADAY. Yes.

Senator STENNIS. By the Secretary of Defense?

Mr. HOLADAY. Yes, sir; the Secretary has the power and authority to overrule me.

Senator STENNIS. So that would terminate your real directorship right at that point, right at the point where you had this conflict of conclusions with the Secretary of Defense; is that correct? You would no longer be Director of this missile program, should that occur; is that correct?

Mr. HOLADAY. On that single item that certainly is true.

Senator STENNIS. I mean on this mission and that is your single mission now, is it not, missiles?

Mr. HOLADAY. Yes. But I certainly assume that this would be in some area of the entire missiles that he might overrule me, and that therefore in that particular area, having overruled me, I would say he becomes the director instead of myself.

Senator STENNIS. These are not critical questions. It is just a question of power and authority and the ability to plan, and then the ability to act.

Mr. HOLADAY. That is correct.

Senator STENNIS. So should there be this conflict, then, directly on a major matter concerning your missile program that you were directing, a conflict occurring with the Secretary of Defense, he would have the final say?

Mr. HOLADAY. Yes, sir.

IF BUDGET BUREAU WITHHELD FUNDS, APPEAL WOULD GO TO PRESIDENT

Senator STENNIS. The same is true now even though you and the Secretary of Defense should agree, if the question involved was money or funds. Assuming the money had been appropriated, it is still under the control of the Director of the Budget Bureau, Mr. Brundage. So even though you are director of this program, missile program, and reached a plan and a conclusion and a decision and undertook to carry it out, Mr. Brundage, by withholding the funds, could stop you at any point; is that correct?

Mr. HOLADAY. Yes, sir.

Senator STENNIS. So you are not Director beyond his decision with reference to money?

Mr. HOLADAY. Yes, sir. We would go to the President to ask to have that rescinded.

Senator STENNIS. That was my next question. The President is a very busy man, necessarily so. Your next step would be to go to Dr. Killian or to the President?

Mr. HOLADAY. To the President.

Senator STENNIS. You would go to the President?

Mr. HOLADAY. Yes; we certainly would discuss it with Dr. Killian and would have him go with us.

Senator STENNIS. I am sure you would, and it would be valuable advice that he would give you, but still it would be just advisory?

Mr. HOLADAY. Yes, sir.

Senator STENNIS. What Dr. Killian said?

Mr. HOLADAY. Yes, sir.

Senator STENNIS. Going back just a second, on this difference you had in opinion with Mr. Brundage, you would nevertheless be stopped on your program even though the Secretary of Defense agreed with you, because the Director of the Budget would be superior in money matters to you and Mr. McElroy, the Secretary of Defense? That is correct, too, is it not?

Mr. HOLADAY. That is my understanding.

Senator STENNIS. So if this situation developed on money, and if you and Secretary McElroy did not agree, you would have to go to the President alone, would you not, and that raises the question, do you have the authority to take this matter to him without Secretary McElroy's consent? I want to be sure that I have made my question clear.

Mr. HOLADAY. Yes, I understood your question, I think.

Senator STENNIS. When I said "to him," I mean to the President, without Secretary McElroy's consent.

Mr. HOLADAY. I personally would not go out of line to do that. I would think this would be going out of line.

Senator STENNIS. I would think that your decision on that would be correct, sir. So you with the title of Director of Missiles, you are still so hemmed in that you cannot even go to the President of the United States with a problem or with a decision that you are stopped on, without the consent of the Secretary of Defense; that is correct; is it not?

Mr. HOLADAY. That is true. I am sure that if I felt this way, I would go to the Secretary and ask him to go with me to discuss it before the President, and I am sure that being an industry man, with the kind of background and training we have, he would go with me.

Senator STENNIS. These are no reflections on Mr. McElroy, with whom we were well impressed, or Mr. Brundage either. But this comes to a matter in Washington of who has the power, and I want to make the record clear as to what power you do have, and then where this power does stop.

So if the Secretary of Defense agreed on this matter to let you go to the President, even though you would have to go and tell him that it was a matter that you and the Secretary of Defense were not

together on, you would go on up, but without the blessings, if you may put it that way, of the Secretary of Defense?

Mr. HOLADAY. I do not think I would go up, sir.

Senator STENNIS. You would not go at all?

Mr. HOLADAY. Without the approval of the Secretary.

Senator STENNIS. I would certainly think that you would be at a disadvantage to go without him.

So by a brief review then, you could be stopped entirely by the Secretary of Defense, one member of the Cabinet, or by the Director of the Budget, either one or both?

Mr. HOLADAY. That is right.

SOLUTIONS OF THE "NEED TO KNOW" QUESTION

Senator STENNIS. May I ask you just a few questions here, and I will read the entire paragraph first, and then read it to you with my question again. I have a letter here that has just come in from the Aeronutronic Systems, Inc., a subsidiary of Ford Motor Co. It is in response to a letter from the counsel for the committee and is signed by Mr. David Altman, head, Propulsion Department.

(The letter referred to is as follows:)

AERONUTRONIC SYSTEMS, INC.,
Glendale, Calif., December 11, 1957.

EDWIN L. WEISL,

Special Counsel, Senate Preparedness Investigating Subcommittee, United States Senate Committee on Armed Services, Washington, D. C.

DEAR MR. WEISL: I am replying to the letter you recently sent me concerning my views on the conduct of our missile and satellite programs. My contact with the program was initiated in 1945 and for many years I was directly involved in the research and development of propulsion systems. During the last few years, my concern has been oriented toward propulsion requirements of our various missiles as used for defense and scientific missions.

In responding to the questions posed, I have attempted to phrase my replies in broad terms so that they might be useful, or at least suggestive, at a national level. Consequently, objections which were symptomatic of only a single program are not discussed. I have omitted a number of criticisms where recommended alternatives appear to create different but equivalent objections.

The use of scientific manpower in the missile program has been reasonably adequate but the same is not true for our satellite program. The latter has been a nonpriority program with a loose and ill-defined management until very recently. Because of the low budget, poor management, and lack of priority, it was difficult to obtain the most qualified manpower on the program.

A bottleneck in research and development which appears more or less common in all programs is the restricted flow of technical information. The reasons appear to be inter- as well as intra-service rivalry and propriety interests. Information which flows most freely is basic research and early models of engineering developments. The tool employed for creating this restriction is the "need to know" requirement, an important but often abused power. It is true that a qualified individual or group will eventually receive the required information but frequently too late to use or at the expense of a delayed program.

A second type of bottleneck frequently occurs in a program for purely technical reasons resulting from poor planning. Sometimes when a poorly conceived program passes the Government evaluation committee, the modifications subsequently made in the conduct of the program result in great expense, loss of time, and reduced efficiency. An example of this type of bottleneck occurs in our Vanguard program. The Navy Vanguard missile program was originally sold largely because "off the shelf" engines could be used thereby making possible a low-cost program on a shortened time schedule. Specifically, it was claimed that the Viking and Aerobee engines could be used. As the program progressed, however, three new engines were authorized for development which contributed to the almost tenfold increase in program cost over the original estimate. In all fairness, responsibility for part of this blunder must be charged to the original

Department of Defense Satellite Committee which apparently failed to realize that the engine modifications to the Viking and Aerobee required for fulfilling the mission were tantamount to new engine developments.

Bottlenecks have occurred in the production of some of our earlier missiles such as Redstone, Corporal, Sergeant, and others but I believe that these are being eliminated in the later programs, such as Jupiter, Thor, Atlas, Snark, etc. These bottlenecks occurred in the transition from research and development at one organization to production at another. The bottleneck, when it occurs, is very costly in time, money, and operational reliability as evidenced in the Corporal program.

RECOMMENDATIONS

1. *Centralized management.*—I am convinced that one of the major bottlenecks to the conduct of both the research and development and production aspects of our missile program is derived from the multitudinous levels of responsibility and authority. The major cause is derived from assigning almost total responsibility to three services with their long chains of command. A strong central management should be located in the Department of Defense which maintains prime responsibility for the evaluation and coordination of all missile programs. Delegation of authority and responsibility for the origination of and liaison with particular programs may be assigned to the individual services. This move is of utmost significance and I believe that many of the objections which I and others have cited will be at least partially dissolved in a natural fashion under a more unified management system.

2. *Combination of missile and satellite programs.*—The satellite missile differs very little from the ballistic missile since the engine performance requirement is only 10 to 20 percent greater than that of an ICBM. As a consequence, differences between the missiles are only matters of degree rather than kind. Continued separation of the two programs can only lead to inefficiency and wasteful duplication of missile components. The Vanguard program is a pertinent example illustrating this argument. At least two of the engines for the Vanguard missile are unique and probably will not find application in other defense missiles. However, if engines from the missile programs had been made available for the Vanguard, a satellite missile of far greater capability, reliability, and less eventual cost would have resulted. I should like to maintain, however, that the major justification for combining the missile and satellite programs stems from the fact that the two differ only in a small matter of degree rather than kind, and that both programs have much to gain by combination of effort. This recommendation implies, therefore, that the Department of Defense set up a space-flight group which is responsible to the missile program manager. Suitable priority can be assigned to the satellite division from time to time as the military demand requires.

3. *Advanced systems planning.*—In addition to the special advisory panels in the Office of the Assistant Secretary of Defense for Research and Engineering (propellants, engines, guidance, etc.), a system panel should be formulated, whose prime function is to coordinate all the recommendations of the specialist groups with the requirements of the services. This systems panel will have several major responsibilities. It will study in detail the technical requirements of existing and future missions, and make recommendations in the research and development area which will keep our national program abreast of obsolescence. This coordinated study will provide the most efficient use of existing manpower, facilities, and technology, since it will result in a recommendation for the development of the least number of versatile missile components to satisfy both present missions and those in the immediate future. As an example, careful planning can result in a minimum number of engines to satisfy all contemplated programs. It is obvious that as development is concentrated on a minimum number of versatile engines, the result is reduced cost, increased efficiency, and most important, increased reliability. The systems groups which presently exist in the individual services I believe to be inadequate because they do not combine the requirements of all services and they are not staffed with suitable civilian personnel. Because of the importance of this combined group of component and system panels, they should be placed at a high level in the Department of Defense. Their recommendations should be delivered directly to the missile manager regarding the sponsoring or cancellation of programs.

4. *Research application.*—Our present research and development effort should be expanded slightly, but most important of all, an effort should be attached to monitoring the research programs. A large number of well-conceived research ideas are frequently permitted to drift along endlessly for several years because of

the lack of monitoring at a high enough level where the authority exists for translating the program into engineering development.

Experience for making such an important judgment takes years to develop but I think there are qualified individuals at present who have developed sufficiently good judgment to evaluate the potential of current research programs. A number of long-range missions are presently delayed because of poor timing in the transition to engineering development.

5. *Controlled duplication.*—Duplicated programs should be reviewed periodically and no less frequently than on an annual basis. Some duplication, particularly on essential programs, is necessary as a backup. However, when permitted to continue, there results a waste of time, money, and manpower. Interservice duplication has been more difficult to eradicate under the present management system but can be controlled with strong centralized management in the Department of Defense. I would like to suggest that the important criterion for justifying duplication be a difference in concept for accomplishing the mission rather than a difference in personnel employing a similar concept. The present duplicated programs such as the Atlas-Titan-Snark; Jupiter-Thor-Polaris; Corporal-Sergeant; etc., should be periodically evaluated in terms of their state of development, usefulness, and probable obsolescence.

6. *Flow of information.*—A centralized information agency should be formed with the prime function of studying the technical communication problem between the various organizations engaged in missile programs. This agency should also have access to information gathered by the Central Intelligence Agency on foreign developments. Such information should be disseminated to organizations capable of benefiting. As a specific illustration, information on the Russian missile capability has not been disseminated to organizations who have the responsibility for developing similar components in this country. By studying the details of the Russian program and philosophy, information can be gleaned and evaluated in terms of usefulness in our program.

7. *Educational program.*—In order to provide for a sufficient quantity and quality of scientific manpower in the future, a broad educational program should be initiated. This can take the form of Government scholarships, subsidized foreign translations of periodicals and books, and Government-sponsored movies and television programs. Thus, by stimulating interest through the mediums of literature, movies, and television and by the provision of scholarships in science, an adequate and high quality of scientific manpower will result.

Very truly yours,

DAVID ALTMAN,
Head, Propulsion Department.

Senator STENNIS. One paragraph here attracts my attention. He says on page 1:

A bottleneck in research and development which appears more or less common in all programs is the restricted flow of technical information. The reasons appear to be inter as well as intra-service rivalry and proprietary interests. Information which flows most freely is basic research and early models of engineering developments. The tool employed for creating this restriction is the need to know requirement, an important but often abused power. It is true that a qualified individual or group will eventually receive the required information, but frequently too late to use it, or at the expense of a delayed program.

Let me read the first and last sentences of that and ask one question.

A bottleneck in research and development which appears more or less common in all programs is the restricted flow of technical information, the reason appearing to be inter as well as intra-service rivalry * * *. It is true that a qualified individual or group will eventually receive the required information, but frequently too late to use it, or at the expense of a delayed program.

Now, what is your comment in reference to that observation here of this gentleman?

Mr. HOLADAY. Sir, I have to agree that it is probably correct because of the number of people that I have talked to in industry that run into this difficulty, and the time and effort I have to devote to getting the right information to them. There is apparently quite a bottleneck here in this particular area. As I pointed out this morning,

I don't know the answer how to get to this, but it is something that we are working on and is in an area in which we need to make more progress.

Senator STENNIS. I have been on the Armed Services Committee a few years and know of the very fine and high quality men our officers are, but at the same time, I could see where this could exist without them being too much to blame for it individually.

Mr. HOLADAY. Yes, sir.

Senator STENNIS. But do you not think it is one of the things that you must delve into and reach and pull out and get some kind of an answer to it to help this program move along?

Mr. HOLADAY. Yes, sir.

Senator STENNIS. Are you giving that special attention now?

Mr. HOLADAY. I am giving it attention. I am afraid I cannot straighten it out enough to give it all the attention it needs. I cannot spread myself too thin.

Senator STENNIS. You have someone helping you look into it, I hope.

Mr. HOLADAY. Yes, it has been looked into for quite some time, and we don't seem to be able to get the answer yet. The answer is very elusive and very difficult to get hold of. I am in the hopes that some of the discussion that has been held here now will assist in easing this situation.

Senator STENNIS. Why, you must have more power to get more results, and I would not embarrass you by asking you to call on past judgment on the amount of power or your lack of it, but I believe that at this point you have very frankly answered as you have as well as the illustrations here of your limited power, after all these and other matters clearly illustrate the necessity of having to empower someone as director of missiles that has the authority to make a plan, and then make the plan work and carry it through, if necessary, over any roadblock or restriction that might occur from the Budget Bureau, the Secretary of Defense or anyone else, subject only, of course, to the President of the United States.

I hope that some vehicle of that kind will quickly evolve because I believe we are burning a lot of daylight, and I commend you for your efforts and your work.

Mr. HOLADAY. Thank you, sir.

Senator STENNIS. I believe that Senator Bush is next.
Senator Bush?

ON THE QUESTION OF SAFEGUARDING CLASSIFIED INFORMATION

Senator BUSH. Mr. Chairman, before I ask any questions, I desire to use part of my time to make a statement for the record concerning a matter with which I am very much concerned about.

I have been deeply shocked by the failure of this subcommittee to safeguard secrets entrusted to it in executive session, and by the failure of some elements of the press to refrain from publishing information which may be of great value to our potential enemy.

Mr. Allen Dulles, Director of the Central Intelligence Agency, testified before us when these hearings began 2 weeks ago: because public disclosure of the information he wished to present might endanger the security of the United States, we heard Mr. Dulles behind closed doors.

The session was so closely guarded that even United States Senators who were not members of the Armed Services Committee were excluded by order of the subcommittee chairman.

Yet a few days later articles began appearing in various news media purporting to report what Mr. Allen Dulles told us.

For example, the December 9 issue of Newsweek magazine on page 58 under the headline "Russia's missile firepower—cold facts," published an article purporting to give an account of our briefing by Mr. Allen Dulles.

I do not intend to give aid and comfort to the enemy by confirming or denying anything which appeared in that article, but there is some evidence that it may have been written on the basis of information which had been leaked to the writer by someone among those present at this briefing.

I recognize the right of the American people to know all the facts concerning our national security which can be disclosed with safety.

I recognize that publishing is a fiercely competitive business and that reporters and editors work under great pressure to produce scoops.

But Mr. Chairman, the right of the American people to survival is superior to their right to know.

If we hand all our secrets to our potential enemy on a platter by publication in the press, the American people may find themselves well informed but vanquished.

Breaches of security are not confined to this one instance. Almost every day we pick up our newspapers and magazines and find published information which might endanger our national security. One may sometimes wonder why the Russians bother to have a spy system when so much of the information they seek is printed in the press, and I recall, I may say parenthetically, that Dr. Vannevar Bush made that observation himself, when he was a witness here before this committee.

Mr. Chairman, we should talk less and publish less and accomplish more. I hope that in these dangerous times a higher sense of responsibility for safeguarding national secrets will guide both those privy to such information and also members of the press.

There has been too much pressure for secret information on the part of the press and too much loose talk by some people in official life.

The breaches of security which followed Mr. Dulles' secret testimony may well hamper the work of this committee, this subcommittee. It undoubtedly will be necessary to hold future executive sessions in order to obtain top secret and secret information about our missile programs.

Mr. Holaday has said that some of the information which counsel sought from him this morning could only be given behind closed doors.

In view of the leaks which followed Mr. Dulles' appearance, what Government official can be sure that classified information he provides us will not be turned over to Russians via the press?

It may well prevent a full disclosure which the Armed Services Committee should have in order to form intelligent judgments.

Mr. Chairman, I hope we may have an opportunity to discuss this matter further when the committee meets in executive session.

LEAKS CITED BY SENATOR JOHNSON

Senator JOHNSON. I should like to say for the information of the committee that I talked to the Senator from Connecticut about this matter briefly this morning.

I deplore as he does any information that is ever given in executive session being revealed. I don't think that I have ever been guilty of that in the 20 years that I have served on the Armed Services Committee.

I see in the newspapers leaks that come from my colleagues every day, from Senators every day, and also from the executive department every day.

I will say to the Senator from Connecticut that I hope he will send a copy of that to the executive department, because I have obtained a great deal of my information on foreign and domestic policy from the front page of the New York Times.

I don't condone leaks. I don't know which one of the Senators gave it out if any Senator actually gave it out or if a member of the staff gave it out.

It seems that Mr. Dulles had his opinion about who might have when he discussed it with some members on this side of the aisle and he had his opinion of who might have when he discussed it with the Senator from Connecticut and they were two different people.

Senator BUSH. He did not mention any person in discussing it with me.

Senator JOHNSON. I thought the Senator gave me the definite impression that he felt that it was some particular member this morning.

Senator BUSH. He may have had one in mind, but he did not mention him to me by name.

Senator JOHNSON. I did not get the full implications of the Senator's statement. I thought that he felt that perhaps it was a member of the majority.

Senator BUSH. He may well have thought that but he did not give me any name.

Senator JOHNSON. That was the impression I got from the Senator.

Senator BUSH. The Senator might have gotten that impression.

Senator JOHNSON. Did the Senator intend to leave that impression?

Senator BUSH. I did not say it was my impression.

Senator JOHNSON. Did the Senator say it was Mr. Dulles' impression?

Senator BUSH. I said that Mr. Dulles voiced the thought that it might have been some Senator, but he did not pinpoint it at all.

Senator JOHNSON. I thought the Senator—

Senator BUSH. The chairman here and I are getting into a little bit of an argument now.

We are both on the same side I think, but the chairman's suggestion to me when I spoke to him privately was that possibly this had been one of my colleagues on the Republican side.

Senator JOHNSON. That is correct.

Senator BUSH. I said possibly it was, but I did not think it was Mr. Dulles' thought when he spoke to me.

Senator JOHNSON. I think that was the thought when he spoke to us, so whether it is a Democrat or a Republican, I guess it is being played both ways. It is a situation to be deplored, and I do deplore the action. I have limited the number of people to attend this to as

few as I can. I have asked my colleagues who are not members of the full committee to not even participate.

I asked Senators who are not members of the Armed Services Committee to leave the room. I confined the staff group to a very limited few, all with the highest clearance. I deplore what has happened, although I will say to the Senator that it is not unusual, that it has happened in the legislative branch before. On practically every briefing, some kind of information comes out of it.

When we learn to control Senators, why you will have a formula that I have not been able to obtain.

I hope that the Congress never provides as many leaks as the executive department does. I have felt for some time that a great deal of the information that I am able to get on foreign and defense policy first was revealed through the press.

Senator BUSH. Mr. Chairman, may I say first in raising this point I did not raise it on a partisan basis.

Senator JOHNSON. Nor did I.

Senator BUSH. I did not do it with any implication that it might have been a Senator on your side of the table or on this side, because I honestly don't know.

I did raise it after you told me that it might be one on my side, and I just want to make it clear that I do not raise this as a partisan matter.

The chairman has been very wise and very diplomatic in keeping these hearings on a nonpartisan basis, and I certainly do not want to appear not to fully support him in that very worthy effort, so I trust the Senator will understand me fully on that point.

And I further thank the Senator for putting in the record that I did discuss the matter with him before I ventured to make my statement, and told him I intended to make some remarks on this subject.

Senator JOHNSON. The chairman did not hear all that the Senator from Connecticut said but what he hear he fully embraces and he does not seek to sit in judgment on his colleagues. He does not know or does not care which side of the aisle it came from. He trusts it won't be repeated. He has pleaded with the Senators to observe the rules under which this information is given to us, and when he was first notified of it in Texas and asked for his comment, he said that I would not attach much importance or much credence to any information that came from a person who received that information about his country as top secret information and then revealed it.

I would not give much credence to it, and I think that that is the way that type of information ought to be treated.

I hope that we don't spend a lot of our time trying to give out top secret information that can help only the enemy.

I appreciate what the Senator has said.

Senator BUSH. Mr. Chairman, I just want to make it amply clear that my comments are not even remotely to be considered as any criticism of the chairman.

On the contrary, I feel that he is doing a splendid job here, and I support everything that he has done. I also support his statement about the executive branch in matters of this kind, and I hope that they will pay some attention to these remarks, if they ever do come to their attention.

Senator JOHNSON. I appreciate very much the high level of the Senator's statement, and I think if he has concluded, that is a good time to end.

Senator BUSH. I have concluded the statement but I wonder if the Senator would not let me finish my time.

Senator JOHNSON. Sure.

Now will the Senator yield for me to make a very brief statement?

Senator BUSH. I will be glad to yield for that purpose.

REMARKS ON PRESIDENT'S TRIPS TO NATO MEETING

Senator JOHNSON. While we are in such perfect accord, I should like to report a matter to the members of the committee. When we lunched together today and I told the members of my understanding that the President was leaving at 5 o'clock this afternoon to attend the meeting of the North Atlantic Treaty Organization, and that I felt that I would like to call him and say to him that the members of the committee, both Republicans and Democrats, were thinking of him, and that our thoughts and our prayers went with him as he left, and we hoped that he would have a successful meeting.

I did call him and told him that yesterday I had been asked a question in a speech that I was making in Texas about the matter, and I stated that I thought he was going at a great sacrifice.

Certainly he was not going as an Atlantic sightseer, or a tourist because he had seen Paris before, but he was going because he believed that with all of his heart and head that he could make a contribution to preserving the freedom in the world.

I told the President that as far as some dozen Senators present today were concerned we realized this meeting was of great importance, that we felt that he should know that we wanted him to go as President of the whole United States, and that we wished him Godspeed and every success, and that he would find us helping him in every way we could.

He said he was very touched by our thoughtfulness in calling him, and that it would strengthen him on the mission which he was undertaking.

I wanted to report that to my colleagues. He said that he wished that I would say to each of them that he thanked them from the bottom of his heart for their thoughtfulness as he undertakes this very important assignment.

I thank the Senator for yielding to me.

Senator BUSH. I just want to applaud your statement to the President. We are all in full support of it.

Mr. Holaday, possibly this little interlude has given you a little relaxation here and it might be well.

Mr. HOLADAY. I took a little relaxation; yes, sir.

Senator BUSH. Let me ask this question.

The question before us most frequently seems to resolve around the question of some sort of unification.

Can't we do something to eliminate the rivalry between these armed service organizations?

And there seems to be too much competition, more competition than cooperation almost between the services in connection with this whole missile program.

I wonder if you can answer this question.

If we were starting afresh, and knowing what we know today about the rivalry between the services and so forth, and so on, do you think it would be practical if we developed a unified approach and had just one missile program, one missile organization which might be like the United States Air Force, let's call it the United States Missile Force, or a unified command which could administer the entire missile business, the research and development end, the manufacturing end, the contracting end, and then turn over to the armed services these missiles for use as the high command where the military thought they were best suitable for use?

My question, to repeat it, is if we were starting now do you think it would be better to approach it that way, or would we be better advised to let each service go out and see what it could do in the field, which seems to have been the way it has happened during the past 8 or 10 years?

Would you care to comment on that or not?

THE MOVE IS TOWARD CENTRALIZATION OF MISSILES RESEARCH

Mr. HOLADAY. I will try to comment on it, and I will of course express my personal views and experience.

Certainly, you could separate out a research and development area on missiles and carry it out in one section or area.

I think this is the direction in which we are moving in setting up this new office on advanced missiles.

However, when you get down to it, if you separate these fellows completely from the military service, my feeling is if they went on into manufacturing and things of this type, it is very doubtful to me that this would turn out a missile system that could be used by the services.

The services have to be considered in this thing very definitely as to the methods of deployment. They are the experts on how to conduct war, and they are the experts on how to take these systems and put them into their operation.

I get, therefore, to the place of thinking that research and development can be carried on to a great extent separated from the services, but when you start to move into finishing up the system, get into production, fitting together the missile and ground-support equipment and the methods of training and so on, this has to be integrated with the services.

Now, each service does not necessarily have to develop a family of missiles for itself. In certain cases, they become specific requirements for that particular service. We are attempting in our work now to make missiles which can be used over a greater range, and, if it is developed by one service, this does not necessarily narrow it down to being used by another one.

The Jupiter, as we are going ahead with it, is developed by the Army, is going to be manufactured by the Army and is going to be deployed by the Air Force.

We have other missiles that are coming along in research and development and we have more than 1 service following the research and development to make it applicable to more than 1 service's use.

For instance, the Polaris missile, which is being developed primarily for the Navy, is being considered for use by one of the other services as an IRBM missile.

Mr. answer was quite long, and I apologize for using so much of your time.

Senator BUSH. That is all right. I have plenty of time. That is just exactly what I wanted to get. Thus, there would be no advantage, in your view, then, at this time to attempt a unification of the administration of the missile business straight down the line.

In other words, the supervision which you and your organization are in a position to supply, the supervision and unification of purpose which you can supply, would seem at the present time, having gone as far as we have on the other line, that our most economical and most effective course would be to continue that form of organization.

Mr. HOLADAY. For the immediate future, yes, with some modifications which will be indicated as our experience improves, such as I indicated to you. This new Agency will do a certain amount of research and development in a unified manner.

FUNDING OF THE MISSILE PROGRAM

Senator BUSH. Mr. Holaday, we had some testimony here at the first session, during the first set of hearings that this committee held, showing the amounts that had been spent over a period of years on the missile program, and, if I recall it correctly, they ended up with an item of \$4¼ billion, which was the amount expended in fiscal 1957, ended last June 30, and projected \$4.6 billion for the current fiscal year, and then we have since seen that the President has recommended to the Congress that it consider on top of that an additional \$2 billion, which, I presume, a large part of that would go into fiscal 1958, the current year.

Mr. HOLADAY. Yes, sir.

Senator BUSH. Which might make that year have some \$6.6 billion available. This is a tremendous sum of money. From this, I hesitate to conclude that we are starving the program or that we take a stingy attitude toward it. Would you care to comment on whether you think that additional \$2 billion suggested by the President is a reasonable one at this time, or have you given any thought to the actual amounts by which this program ought to be increased?

Mr. HOLADAY. Yes, sir; I agree that this is a reasonable amount, because it happens to be one of the numbers I started using quite some time ago myself.

Senator BUSH. So, you fully concur in the recommendation that the Congress consider that additional amount of money, an additional \$2 billion?

Mr. HOLADAY. Yes, sir.

Senator BUSH. On top of the \$4.6 billion already available in 1956 fiscal year.

Mr. Chairman, I will yield the floor.

Senator JOHNSON. Senator Symington, I am sorry that we have run over our time limit, and I am the worst offender, but, if you will indulge us, we will make it up tomorrow and work it out where we alternate questioning.

Senator SYMINGTON. Mr. Chairman, I thank the Chair for his courtesy, but am satisfied. There are two points I would like to bring up that the distinguished Senator from Connecticut mentioned.

First was my understanding, from what the Senator said, that Mr. Dulles may have some ideas as to who is responsible for some of these leaks. If that is true, I suggest Mr. Dulles be received by the committee in executive session, give his opinions, and that then it might be pursued by some of the other agencies in Government.

Senator JOHNSON. I thank the Senator, and we will give consideration to it, although I want to get through with this investigation before I start one on the Senators.

Senator SYMINGTON. The agency that might pursue that is not particularly interested in this particular investigation.

Senator JOHNSON. I thank the Senator.

Senator SYMINGTON. I thank the Chair. The second point the Senator from Connecticut mentioned was possible further unification.

I admire Secretary McElroy for his courage in taking this position. I believe his chances of success are comparable to the chances of those who preceded him, because of the nature of the current organization in the Pentagon.

I also believe the Congress is not blameless with respect to the setup, because of the stipulations and restrictions in the National Security Act of 1947, as amended.

Mr. Secretary, with respect to the Secretary of the Navy, does he report to you on missiles?

SECRETARIES REPORT TO HIM

Mr. HOLADAY. Yes, sir; I would say that, in connection with the missile program, the Secretary of the Navy comes to me with his program. We have approved authority of the program within the Navy dealing with missiles.

Senator SYMINGTON. And the Secretary of the Army. He reports to you on missiles?

Mr. HOLADAY. Yes, sir.

Senator SYMINGTON. And the Secretary of the Air Force. He reports to you on missiles?

Mr. HOLADAY. On missiles.

Senator SYMINGTON. Do you consider this latest action of the Air Force within your normal responsibilities?

Mr. HOLADAY. Which action, Senator?

Senator SYMINGTON. I refer to an article, the Astronautics Agency, set up despite requests for delay.

Mr. HOLADAY. No, sir; this is primarily Secretary Quarles.

Senator SYMINGTON. So, your remark about the Air Force trying to shove itself into the limelight was outside of the responsibilities of your Department; is that right?

Mr. HOLADAY. Yes, sir.

Senator SYMINGTON. You were just giving your comments?

Mr. HOLADAY. That is right.

Senator SYMINGTON. Do you think coming up here and discussing the matter in that way is beneficial to unification of the services?

Mr. HOLADAY. This of course is out of my particular realm that I am an expert on. I will again have to give you my views on it.

Senator SYMINGTON. But you commented on it, did you not?

Mr. HOLADAY. Yes, I commented on it here and I want to comment on it to you in answer to your question here.

What turns out sometimes to be perfectly good plans and you look like you are moving forward all right turn around and trip you, I will have to admit, when too much of it gets aired before the final plans are well defined.

Senator SYMINGTON. Do you know Secretary Douglas?

Mr. HOLADAY. Yes, sir.

Senator SYMINGTON. You have respect for him, have you not?

Mr. HOLADAY. I certainly do.

Senator SYMINGTON. You know him well enough to know he would not deliberately do a thing of this character, do you not?

Mr. HOLADAY. Yes, sir.

Senator SYMINGTON. Then how do you think if he is the boss of the Air Force the Air Force is trying to shove it into the limelight? Would you file a statement at this point as to just what the facts are in this situation?

Mr. HOLADAY. The facts normally would not come to me, sir.

Senator SYMINGTON. But you commented on it as an Assistant Secretary or Director of the Department of Defense.

Would you get the facts at this point from the Secretary of the Air Force and file them?

Mr. HOLADAY. Yes, sir.

(The requested information is contained in an Air Force memorandum dated December 23, 1957, signed by James H. Douglas, as follows:)

DEPARTMENT OF THE AIR FORCE,
OFFICE OF THE SECRETARY,
Washington, D. C., December 23, 1957.

Memorandum for Director of Guided Missiles, OSD.

Subject: Facts concerning establishment of Directorate of Astronautics, DCS/Development, Hq USAF.

The Senate Preparedness Investigating Subcommittee of the Committee on Armed Services during hearings December 13, 1957, on satellite and missile programs requested that the facts concerning establishment of a Directorate of Astronautics, DCS/Development, USAF, be obtained from the Secretary of the Air Force and furnished for the record (p. 1008).

In response to the oral request of Col. D. E. Williams, Office of the Director of Guided Missiles, OSD, the following facts are furnished:

To accomplish what was believed to be better staff organization in connection with problems involving research and development in space flight, the Deputy Chief of Staff, Development, decided on a reorganization of his staff to include a Directorate of Astronautics. Since this was an internal Air Force matter, it would not, as a matter of course, come to me for approval. I first learned of the proposal when a proposed press release announcing the establishment of this Directorate was brought to my attention.

Following a conversation with Secretary Quarles, I assured him that no action would be taken toward the establishment of a Directorate of Astronautics until we had opportunity to discuss the matter fully. I directed that no press release be made and thought I had made it clear that the Office would not be established. Through a misunderstanding of my instructions, the Directorate was allowed to come into existence. When I learned the Directorate had been established, I directed the Chief of Staff on December 13 to dissolve the Directorate. This order was carried out on the same date.

JAMES H. DOUGLAS.

DIRECTIVE DOES NOT STATE REQUIREMENT OF REPORTING TO HIM

Senator SYMINGTON. Mr. Secretary, I believe you stated in missiles the Secretary of the Army, Navy, and Air Force report to you.

Have you a directive clarifying that situation, so it is clear they do report to you on missiles?

Mr. HOLADAY. The only directive I have is the one which was read by counsel this morning.

Senator SYMINGTON. And does that state that the three services report to you on their missile pictures?

Does it state that in the directorate?

Mr. HOLADAY. No, sir.

Senator SYMINGTON. Don't you think there must be some question, inasmuch as roles and missions are pretty well regulated in the National Security Act, as to just what your authority is?

Might it not be a good idea to have it clarified in a directive from the Secretary of Defense to you?

I will withdraw that question if it is to take time because I don't want to run over my time and I have several other questions. Could you file a statement for the record on that?

Mr. HOLADAY. Thank you.

(Department of Defense Directive No. 5105.10 dated November 15, 1957, follows:)

November 15, 1957
No. 5105.10

DEPARTMENT OF DEFENSE DIRECTIVE

Subject: Director of Guided Missiles.

I. PURPOSE

The purpose of this directive is to provide for the authoritative direction of all activities in the field of guided missiles.

II. RESPONSIBILITY AND AUTHORITY

In accordance with provisions of subsection 202 (f) of the National Security Act of 1947, as amended, and section 5 of Reorganization Plan No. 6 of 1953, there is established the Office of Director of Guided Missiles. The Director of Guided Missiles will direct all activities in the Department of Defense relating to research, development, engineering, production, and procurement of guided missiles.

III. RELATIONSHIPS AND ORGANIZATION

A. The Director of Guided Missiles will report directly to the Secretary of Defense.

B. The Director of Guided Missiles will utilize existing staff organizations within the Office of the Secretary of Defense including appropriate staff members of the Assistant Secretaries of Defense for Research and Engineering, Properties and Installations, Supply and Logistics, Comptroller, and the military departments, insofar as they may be necessary to carry out his assigned functions.

C. The Director of Guided Missiles is authorized such personnel and staff support as may be required for the performance of his duties and as may be approved by the Secretary of Defense.

IV. REPORTS

A. The Director of Guided Missiles may require such information and reports from agencies of the Office of the Secretary of Defense and of the military departments as may be required for the performance of his duties.

B. The Director of Guided Missiles will make regular periodic reports to the Secretary of Defense and will be responsible for the preparation of such reports as may be required of the Department of Defense with regard to guided missiles by the President and the National Security Council.

V. SUPERSEDURE

All directives, instructions, and memorandums or parts thereof to the extent they are inconsistent with the provisions of this directive are modified accordingly or rescinded, as appropriate.

NEIL McELROY,
Secretary of Defense.

Senator SYMINGTON. I believe you said in 1950 a due date on the Atlas was given as of 1965; is that right?

Mr. HOLADAY. Yes; we estimated, to the best of my knowledge, that the date was 1965.

Senator SYMINGTON. That was given in 1950.

Mr. WAGGONER. About 1950, Senator.

Senator SYMINGTON. Would you repeat your name, please?

Mr. WAGGONER. Alvin Waggoner. The statement which I made was that in the early 1950's—

Senator SYMINGTON. No; you said 1950, did you not?

Mr. WAGGONER. No, sir; I did not.

Senator SYMINGTON. Thank you. I asked the counsel, and he felt you did.

Mr. WAGGONER. No, sir; I said in the early 1950's. I believe the record will show that.

Senator SYMINGTON. Would you care to give the year?

Mr. WAGGONER. I would have to check the year, sir.

Senator SYMINGTON. Will you check that, and supply it for the record?

Mr. WAGGONER. Yes, sir; I will.

(In a Department of Defense memorandum filed subsequently with the subcommittee, it was reported that, in 1953, the Atlas availability was predicted to be not earlier than 1965.)

Senator SYMINGTON. And the statement was?

Mr. WAGGONER. That in the early 1950's—this is back in the Research and Development Board days—the estimate of the Atlas availability was about 1965. This was based on the best technical estimates that we had at that time.

Senator SYMINGTON. What was your position at that time in the Department of Defense.

Mr. WAGGONER. I was the Deputy Executive Director of the Committee on Guided Missiles of the Research and Development Board.

Senator SYMINGTON. Would you have some paper you could put in the record at this time which would justify your making that statement?

Mr. WAGGONER. Yes, sir.

Senator SYMINGTON. Do you know what report was made at that time?

Mr. WAGGONER. At that time there were a series of documents in which we showed all of the estimated availability dates of the guided missiles, of all guided missiles. The date that I am referring to is the date that, unless my memory fails me, is carried in that, and I will be glad to supply that page for the record.

[The information requested of Mr. Waggoner is included in the classified records of the subcommittee.]

Senator SYMINGTON. When was the ballistic-missile program reactivated; do you know?

Mr. WAGGONER. The ballistic-missile program was essentially re-activated in early 1951.

Senator SYMINGTON. In early 1951. At that time, what was the date, the estimate of the ICBM?

Mr. WAGGONER. The only date that I have, Senator, is the one that I gave, so I will have to furnish that one for the record. The date did not change, as far as I recall, until the program was re-oriented in 1953 or 1954.

Senator SYMINGTON. In 1953 or 1954; thank you.

“THE MAZE OF MISSILE MANAGEMENT”

Now Mr. Director, have you seen a chart called The Maze of Missile Management that was in Life magazine, inserted by Mr. Trevor Gardner?

Mr. HOLADAY. Yes, sir.

Senator SYMINGTON. In that chart, I believe he has 95 boxes of various responsibilities and authorities. Has that chart been changed recently?

Mr. HOLADAY. Yes, sir. There certainly has been some modifications in that chart.

Senator SYMINGTON. What is the modification you consider the most important in the effort to streamline and locate authority and responsibility?

Mr. HOLADAY. This is the concentrating of authority and responsibility in the Department of Defense.

Senator SYMINGTON. The Department of Defense has always run it, hasn't it?

Mr. HOLADAY. Yes, sir.

Senator SYMINGTON. Where is the concentration? Do you mean putting you over the three service Secretaries, so that they all report to you on missiles?

Mr. HOLADAY. No; putting the program all in one office, instead having it divided as it was previously—part in the office of the special assistant to the Secretary and part in research and engineering.

Senator SYMINGTON. Mr. Gardner had a chart—I am talking from the standpoint of structure and function organizationally—in which there is a director of missiles space development; another chart. Do you remember that chart?

Mr. HOLADAY. No.

Senator SYMINGTON. It was also in Life magazine.

Mr. HOLADAY. I recollect looking at it, but I cannot remember it well enough.

Senator SYMINGTON. In this chart the Director of Missiles Space Development bypasses the Secretary of the Army, the Secretary of the Air Force and the Secretary of the Navy, and goes directly to the ballistic missile units, the Ballistic Missile Division of the Air Force, the Army Ballistic Missile Agency, and the project Vanguard.

Is your job of that character, or do you go through the Secretaries of the services?

Mr. HOLADAY. I go through the Secretaries of the services.

Senator SYMINGTON. And do you discuss this regularly with them and give them instructions as to how they shall handle their missile programs?

Mr. HOLADAY. Yes, sir; I develop it through all three of the Secretaries.

Senator SYMINGTON. When was the last time you had a meeting?

Mr. HOLADAY. The last time was on a 2-day trip with both the Secretary of the Air Force and the Secretary of the Army which was last Tuesday and Wednesday.

The Secretary of the Air Force and I plan a trip on Monday to California. This is all in the area of ballistic missiles.

Senator SYMINGTON. When was the last time you talked with the Secretary of the Navy?

Mr. HOLADAY. My last conversation with the Secretary of the Navy was in Secretary McElroy's office just before he left to go to Paris.

HE REPORTS TO THE DEPUTY SECRETARY

Senator SYMINGTON. When the Unification Act was formed, instead of calling the second man Under Secretary of Defense, in order to make him as much as possible an alter ego of the Secretary of Defense, he was called Deputy Secretary of Defense?

Mr. HOLADAY. Yes, sir.

Senator SYMINGTON. Do you report to Secretary Quarles also?

Mr. HOLADAY. My charter says that I report to the Secretary of Defense.

Senator SYMINGTON. Where does that leave the Deputy Secretary of Defense?

Mr. HOLADAY. When the Secretary is out, then the Deputy Secretary becomes the Secretary. In most cases I believe all conversations that I have had with the Secretary of Defense, the Deputy has been present.

Senator SYMINGTON. But if the Secretary is in town, you bypass the Deputy Secretary and report directly to the Secretary on Missiles, is that correct?

Mr. HOLADAY. Yes, sir.

Senator SYMINGTON. Where do the Assistant Secretaries of Missiles of the services, research and development, where do they come into the picture?

Mr. HOLADAY. They are in each one of the services, and my work is with them directly.

Senator SYMINGTON. It cannot be direct if they report to the Secretary of the services; can it?

Mr. HOLADAY. That is right.

Senator SYMINGTON. How do you work that out?

I am talking about day-to-day operation.

Mr. HOLADAY. In day-by-day operation, as we do in some of the areas here, if it is mostly research, the meeting would probably be with them or, as we have in certain areas, we have groups which have those three fellows on them, and they come in and we meet as a group.

Senator SYMINGTON. What would happen if the administration of the program did not suit you?

What do you do in that case?

In other words, as I understand it, you say you have direction of the program, but not administration.

Mr. HOLADAY. That is correct, sir.

Senator SYMINGTON. Is that correct?

Mr. HOLADAY. That is right.

Now it is perfectly proper, and I discuss problems with them, point out my views if this does not resolve the problem I take action to see that it is resolved in the best interests.

Senator SYMINGTON. And how would you do that?

Mr. HOLADAY. If we cannot resolve it in discussions amongst ourselves, I go ahead after discussing it with the Secretary of Defense, and establish a directive indicating which way the program will go.

THOR UNITED STATES JUPITER—"PLAYING IT SAFE"

Senator SYMINGTON. One final thought, or question.

On the Thor and the Jupiter situation, as late as the end of October there was going to be a decision for one.

Mr. HOLADAY. Yes, sir.

Senator SYMINGTON. I want to emphasize I believe it may very well be right to have two. In that connection do you believe that one of these units is the better?

What is your thinking?

As I understand it, it was your decision in this matter?

Mr. HOLADAY. I am not in a position to say whether one is better than the other. I was playing it safe as insurance to give us the assurance of the early availability of an adequate number of missiles.

Senator SYMINGTON. And if you are going to make two, you will have to spend more money in tooling, programing, and so forth, than you would if you were only going to make one. Is that correct?

Mr. HOLADAY. We will have to put more money into the program in ordering more materials, sir.

The extra cost will probably be that which would be a continuation of two R. and D. programs instead of R. and D. program.

Senator SYMINGTON. I understand.

Where are you going to get the money?

Are you coming to the Congress for the program?

Mr. HOLADAY. Yes, sir.

Senator SYMINGTON. Are you proceeding on the assumption the Congress will give you the money?

Mr. HOLADAY. Yes, sir.

Senator SYMINGTON. How much money will you spend roughly, before you appear and ask for more?

Mr. HOLADAY. I would have to give you a guess, and I am not very good at guessing in these matters, but we are not going to spend many millions of dollars.

Senator SYMINGTON. You are not going to spend many millions?

Mr. HOLADAY. No, sir.

Senator SYMINGTON. Five million or ten million?

Mr. HOLADAY. I can't answer precisely, but that is about the right order of magnitude since ABMA is spending about \$15 million per month for Jupiter.

Senator SYMINGTON. Could you find out what the information is, and put it at this point in the record, as to exactly what the additional cost will be in building the two, where the money will come from, and how it is to be presented to the Congress?

Mr. HOLADAY. Yes, sir.

(The requested information is presented as follows:)

THOR-JUPITER COSTS

Current estimates indicate that the cost of completing the currently scheduled production programs for both the Thor and Jupiter missiles would be in the order of \$150 to \$200 million above the cost of completing only one program. A detailed study is now underway to make precise determination of these costs.

Funds for the Thor development program were included in the Air Force fiscal year 1958 budget. The Jupiter program is being financed in part from the Department of Defense emergency fund and in part by reprogramming available procurement funds.

The additional funds required to place both the Thor and Jupiter missiles on an accelerated production basis will be set forth in the fiscal year 1959 budget and in a supplemental appropriation request for fiscal year 1958 to be submitted to the Congress by the President early in January 1958. Pending congressional action on the supplemental appropriation request, Jupiter production can be funded by reprogramming currently unobligated funds.

Senator SYMINGTON. One final point about the overtime situation brought up by the Chair.

It is true, is it not, that there is no restriction of any kind on overtime on missile testing, is that right?

Mr. HOLADAY. That is right.

NO RESTRICTION ON OVERTIME IN BALLISTIC MISSILE WORK

Senator SYMINGTON. There is a restriction, however, on overtime in the corporations that produce defense products including missiles. Is that right?

Mr. HOLADAY. In the ballistic missile area there is no restriction on overtime in the corporations for the production of ballistic missiles.

Senator SYMINGTON. If a company was making engines for airplanes and engines for missiles, they must take their overall overtime. If they put it all in ballistic missiles they have no more overtime for production other than missiles. Is that correct?

Mr. HOLADAY. My interpretation is while they are working on ballistic missiles, they have no overtime restrictions.

There is an overtime restriction if they were working on a tank or if they were working on an airplane engine, things of this type.

Senator SYMINGTON. So your testimony is that there is no overall restriction on a corporation making missiles and other items.

Is that correct?

Mr. HOLADAY. That would be my interpretation, sir, because we have no restrictions in ballistic missiles.

Senator SYMINGTON. And you don't know beyond that point?

Mr. HOLADAY. Yes, sir.

Senator SYMINGTON. In the overtime field?

Mr. HOLADAY. Yes. I think there are other people that can give you a more expert answer because I am not an expert on what they are doing in all the other areas.

Senator SYMINGTON. Mr. Chairman, I have nothing further. I notice a press statement just presented to me on something I asked questions about.

I would ask the Chair to read it to clarify the position of Secretary Douglas; and I yield my time.

Senator SALTONSTALL. Clarify Secretary who?

Senator SYMINGTON. Clarify the position of Secretary Douglas.

Senator JOHNSON. I just want to observe that we have a news release, and I am glad to observe that he will make a decision even if

it is a decision to revoke a decision that they made prematurely. This is a press release dated December 13:

The Secretary of the Air Force today suspended the order creating a Directorate of Astronautics in the Air Force under the Deputy Chief of Staff, Development.

He stated that this order was issued prematurely since the purpose of the new agency will be to serve as an Air Force contact with the proposed Advanced Research Projects Agency of the Department of Defense, which has been announced by the Secretary of Defense but not yet brought into being.

Secretary Douglas explained that the action creating the Directorate in the Air Force was the result of a misunderstanding and contrary to assurances he had given the Secretary of Defense that no such action would be taken until it could be coordinated with the specific plans for the new Agency in the Department of Defense.

That is for the information of the committee members and the staff, and I am sorry that the decision was premature.

I regret the misunderstanding exists, but it seems to me here is a good deal of frustration over there in the Defense Department and I hope, Mr. Holaday, as missile boss you get it straightened out and get some decisions made and some that won't have to be revoked 24 hours later.

Senator SYMINGTON. Mr. Chairman, may I ask one more question?

Senator JOHNSON. Senator Symington.

Senator SYMINGTON. Mr. Director, would you give the committee an analysis of the overtime decision incident to the entire missile picture?

I want to be sure I understand. Therefore, when you give the committee a breakdown of overtime with respect to missiles, specifically with respect to such directives as 4105.48 and 4105.8, would you put the dates any changes were made; in other words, the date the new directive with respect to overtime applied. Please have somebody in the Department, so that we could have it all packaged, as of December 13 include other Defense products produced by companies which also make missiles.

Would you do that?

Mr. HOLADAY. Yes. When do you want us to start this?

Senator SYMINGTON. I would start October 4, 1957.

Mr. HOLADAY. Thank you.

(The information requested of Mr. Holaday is included in the classified records of the subcommittee.)

Senator JOHNSON. What do you define as "overtime?"

Senator SYMINGTON. That percentage, Mr. Chairman, of allowable pay to labor above normal agreed-upon hourly pay. I would not define overtime, for example, as excessive hours worked by monthly people, say engineers or supervisors.

Senator JOHNSON. That is very good.

Any other questions of Mr. Holaday?

Senator SALTONSTALL. Mr. Chairman.

Senator JOHNSON. Senator Saltonstall.

ASSERTS PRESENT AUTHORITY SUFFICIENT

Senator SALTONSTALL. Mr. Chairman, I would like to ask just two questions.

Mr. Holaday, are you satisfied with your present authority as given to you by the directive of Mr. McElroy?

Mr. HOLADAY. Sir, I am finding no difficulty to carry out my job with the authority that is granted to me in this directive.

Senator SALTONSTALL. And that will give you all the authority, all the power and all the directive control that you need?

Mr. HOLADAY. Yes, sir. It partly is responsive to the directive. The other one is the very close working relationship that I have with the Secretary, and that I do not have to call up for an appointment. If I have a problem, I go right up and walk right into his office with my problem, and this relationship is making it possible for me to move the work along efficiently.

Senator SALTONSTALL. Just one other question.

It is always easy to try to solve the problem by appointing new groups or committees. We all know that in any line of work that we do.

Is it your intention to go just as slow as you can with instigating or approving new groups of committees without seeing if the present setup cannot do the job?

Mr. HOLADAY. Yes, sir. I would say it is probably more in this direction of reducing the number of groups, and maybe strengthening some that I already have by getting better balance of membership on them.

But my move would be to reduce the number rather than to add to at the present time, as I see it, sir.

Senator SALTONSTALL. It seems to me in listening to you today, there were too many committees, too many advisory committees.

My second comment is the one I have already made to you, that I hope you and Mr. McElroy will give awfully thoughtful consideration before you set up a new group on this space-satellite business as opposed to the responsibilities that you now have on the ballistic missile program.

Mr. HOLADAY. Thank you.

Senator SALTONSTALL. That is a comment, not a question, unless you want to answer it.

Mr. HOLADAY. No, sir.

Senator JOHNSON. Any other questions?

Senator STENNIS. No questions.

Senator JOHNSON. Senator Carroll, we are delighted to have you with us. Do you have any questions you would like to ask?

Senator CARROLL. Mr. Chairman, just a few very short questions.

Senator Flanders questioned Mr. Holaday, and your response to it was not quite clear to me.

You are coming to the Congress and asking for substantial sums of money. Will the carriages, the launching instruments that launch missiles, be adequate for launching space satellites? I think your answer was "partly, yes."

Can you be more specific?

Mr. HOLADAY. We would have to do considerably more engineering to provide for this. This would probably call for some facilities in the research and development category and not necessarily in the production category.

Senator CARROLL. That is as I understand it—Dr. Hagen testified before this committee not long ago, and I understand through a directive by the Executive he was in a sense given supervision over the satellite program. That is true, is it not?

Mr. HOLADAY. Yes. He has the technical part of the satellite.

Senator CARROLL. Does he operate under your jurisdiction?

Mr. HOLADAY. The Vanguard program is under our direction, yes, sir.

Senator CARROLL. Were you then in your present position in the Department of Defense, in May of this year, June of this year?

Mr. HOLADAY. The Vanguard was put into our area, I don't remember the exact date, it was April, May, or someplace in there.

Senator CARROLL. You were in your present position as that time?

Mr. HOLADAY. I was an assistant to the Secretary of Defense at that time.

Senator CARROLL. One thing, Mr. Chairman, that struck me from this testimony was that, as I recall Dr. Hagen's testimony, and I offered a newspaper article in evidence at the time, there was a 24-page report submitted by the Rand Corp. of Santa Monica to the Air Force in June.

Was that brought to your attention, on the missile program?

Mr. HOLADAY. Just on that broad definition——

Senator CARROLL. This program had to do with the Soviet Union. The prediction was that the Soviet Union would launch their satellite on the 17th.

The purpose of my question is this, Mr. Holaday: In considering the idea of a guided-missile program and the satellite program, almost every Senator has raised the question of the bottleneck in the passing on of scientific information. In this case, Dr. Hagen said he had never heard of it.

Here is a man who is in charge of the satellite program. This is information coming to the Air Force. I do not know whether it ever got to your office, but it seems to me to raise the important question and Senator after Senator has raised this question, How do we break the bottleneck? How do we pass on scientific information so the various agencies of the military will know, so even the people who have contracts will know?

It seems to me that this is very, very vital.

DISSEMINATION OF SCIENTIFIC INFORMATION BOTTLENECK

Mr. HOLADAY. I agree with you that we do have a bottleneck here, and that we have been working on it.

As I have pointed out before, I do not know what the real answer is and how to break through this. I do not know.

I do not know whether we have too many people, or too many restrictions, but certainly we are having trouble in talking to each other.

Senator CARROLL. You are impressed with this bottleneck that exists?

Mr. HOLADAY. Yes, sir.

Senator CARROLL. For example, in this report of Mr. Gardner—I say "report"—in this magazine article, he talks about how the management of scientific decision manages to escape out of the Pentagon-shaped jungle and into the laboratories.

This is one point he raises. He talks in this article—I do not know whether you have read it or not—about the Pentagon. He says 2,400 people under the Secretary of Defense, 500 people under the Joint

Chiefs of Staff. Under the Chief of Staff of the Air Force there are 8,000 people.

How you break it down is a tremendous job, how do you break it down and get the information flowing from one scientific group to another? That is why I come back again to this question:

You have a launching carriage that will launch the satellite; even though it is in the military, it may save us tremendous sums of money.

Mr. HOLADAY. Oh, yes, sir; I agree with you there.

Senator JOHNSON. Thank you very much.

Any other questions? Senator Saltonstall? Counsel?

Mr. Holaday, in response to Senator Saltonstall's question, you said you felt that you had all the authority that you needed to carry out your job, your assignment.

I hope that is correct; but I also hope that you have all the authority you need to build us a missile. That is what I am interested in.

I do not know whether your job is such that you can build some missiles or not, but do you feel in your own heart that you have all the authority you need to get the job done?

Mr. HOLADAY. Yes, sir.

Senator JOHNSON. Get the missiles built?

Mr. HOLADAY. Yes, sir. This, as I have pointed out, is very important in my own personal considerations. I do not want to run down research and development. We have to have research and development to get missiles.

But when we have completed our research and development, the next thing is to get on with the job of making some missiles, and my No. 1 priority at this time is to get some missiles made.

Senator JOHNSON. Mr. Holaday, the committee wants to thank you for your testimony. I think it is very apparent to all of us that you are a patriotic man trying to do a very difficult job under extremely trying circumstances. We hope we have not added to them.

I confess I am still somewhat confused as to the extent of your authority. We hope that can be cleared up in the days ahead; and we hope that we can get the missiles built.

We will excuse the witness for the present.

Mr. Holaday, we will call you back in executive session at some appropriate time that we can agree upon. In the meantime, I hope you will go back to the Pentagon after a good night's rest and get started building us some missiles tomorrow.

Mr. HOLADAY. Thank you, sir.

Senator JOHNSON. I talked too long. Counsel has a question.

Mr. WEISL. Senator Symington is not here, but I would like the record to show, in justice to Mr. Holaday, who has to live with the Air Force and the other branches of the military service, that he did not volunteer anything about this order that the Air Force issued, or use the term "beating the gun." He responded to a question in that respect.

Mr. HOLADAY. Thank you. That is very nice of you.

Mr. WEISL. I also want the record to show that Mr. Holaday, General Betts, and Mr. Waggoner completely cooperated with counsel in the previous interviews that we had, and held nothing back.

Senator JOHNSON. If counsel is referring to my question, it should not read "beating the gun." We call it "jumping the gun."

You are excused, Mr. Holaday.

The committee will take a 5-minute recess while we get this gun situation straightened out.

(Short recess.)

Senator JOHNSON. The committee will come to order.

Our next witness is the Secretary of the Army, Mr. Brucker.

Mr. Brucker, with you we begin to question the various services who have the direct responsibility for producing individual missiles.

A great deal of comment has centered around this point. There seems to be a feeling that each service has a case which must be made to the public. The public, of course, is interested only in the case that could be made for the security of the Nation.

We are going to hear you and the expert members of your staff. We hope that they will tell us how we can get better missiles faster. We are not interested in detailed explanations of why something has not been done, cannot be done. We want to know, if we can, how to do it and how you propose to do it.

To save time, Mr. Secretary, at this late hour, I am putting your biography into the record.

(Secretary Brucker's biographical statement follows:)

WILBER M. BRUCKER, SECRETARY OF THE ARMY

Wilber M. Brucker, former Governor of Michigan, was sworn into office as Secretary of the Army July 21, 1955, following his nomination by President Eisenhower on June 22 and confirmation by the Senate on July 11. He had served as General Counsel of the Department of Defense from April 23, 1954, until he assumed his new office.

Secretary Brucker has a background of Army experience extending back to enlistment in the Michigan National Guard in 1915 and service on the Mexican border as a member of the 33d Infantry, Michigan National Guard, in 1916 and 1917. During World War I he served in France with the 166th Infantry, 42d (Rainbow) Division, in all the division's engagements including Chateau Thierry St. Mihiel, and the Meuse-Argonne. Cited by General Headquarters, AEF, for bravery under fire, he was awarded the Silver Star. He was discharged as a first lieutenant June 5, 1919.

Secretary Brucker was graduated from the University of Michigan in 1916 with a bachelor of laws degree. He was assistant prosecuting attorney for Saginaw County, Mich., from 1919 to 1923; prosecuting attorney from 1923 to 1927, and assistant attorney general of Michigan until he became attorney general February 18, 1928. On November 5, 1930, he was elected Governor of the State of Michigan and served until 1933. Thereafter, to the date of his appointment as General Counsel of the Department of Defense he was a practicing lawyer with the law firm of Clark, Klein, Brucker, & Waples of Detroit, Mich. He is a member of the Michigan State, Federal, and American Bar Association; the American Legion, and Veterans of Foreign Wars. He is a past national president of the 42d (Rainbow) Division Veterans.

Senator JOHNSON. Will you please stand and take the oath?

Do you solemnly swear that the testimony you give this committee will be the whole truth and nothing but the truth?

Secretary BRUCKER. I do.

Senator JOHNSON. General Taylor, do you solemnly swear the testimony you give this committee will be the whole truth and nothing but the truth?

General TAYLOR. I do.

Senator JOHNSON. General Taylor, we appreciate very much your coming here, and we understand the circumstances under which you appear, and we will try to be as considerate as possible. It is typical of you to want to do your duty in any circumstance, and we are grateful to you.

We are glad that this country has a man like you.
General TAYLOR. Thank you.

**STATEMENT OF HON. WILBER M. BRUCKER, SECRETARY OF THE
ARMY**

Senator JOHNSON. Mr. Secretary, if you will proceed with your prepared statement, then we will have counsel begin his examination.

Secretary BRUCKER. Mr. Chairman and gentlemen of the committee, I have a short statement, and I would like to read it.

You are inquiring into a vital aspect of our national security. I feel that these hearings have already done a great service for our country in demonstrating the urgency of national defense.

Senator JOHNSON. Do you appear as Secretary of the Army, Mr. Secretary, or the Acting Secretary of Defense?

Secretary BRUCKER. At this moment, I am Acting Secretary of Defense.

Senator JOHNSON. Congratulations. Down in Texas when we have an Acting Governor, he takes a lot of action sometimes. Maybe we can get some action out of you on some of these missiles the Army has been talking about.

Proceed.

Secretary BRUCKER. That is what some of my associates are fearing.

From past experience, once the American people become thoroughly aroused, the rest of the job will become less difficult.

In view of our international commitments and Soviet advances and improvements throughout its military structure, the Army has felt very keenly the urgency of modernizing its entire program, organization, weapons and weapons system, to build an effective deterrent in this nuclear missile age.

During the last few years much progress has been made. The Army has reorganized along pentomic lines with its new divisions equipped with atomic rockets and effectively supported by a larger missile family available at corps and army level.

The missile has become a key supporting weapon of the modern army. Without missiles, the Army would not be effective on the atomic battlefield and would be unable to execute its mission of defeating the enemy ground forces.

The importance of missiles, both surface-to-surface and surface-to-air, has been clear to the Army since the end of World War II. We have had research-and-development programs underway since that time. We have had both types of missiles in operational deployment for several years.

In the development of the longer range missiles the Army has from the beginning emphasized the necessity for the ground mobility of the missile and its launching equipment. The Army believes that missiles must be mobile in order to survive initial enemy attacks and continue to move and fire so that they will be able to accomplish their combat or retaliatory mission.

Mobile Army missile units can be emplaced in a multitude of firing positions throughout entire land areas. Missiles emplaced in remote mountains, jungles, and forest areas would be difficult to find and hard to destroy.

These here-today-gone-tomorrow units would pose an insoluble problem for the enemies' intelligence and reconnaissance services. Mobile missile units can be completely separated from population centers and other critical military installations.

It is especially important to note that the Army already has in its structure the mobile maintenance, medical, communication, supply, Engineer survey, and construction units which are absolutely essential for the support of remotely dispersed, fast-moving, missile operations.

ARMY WENT "ALL OUT" ON JUPITER PROGRAM

One of the Nation's top priority programs has been the development of the Army's Jupiter intermediate-range ballistic missile. Started late in 1955, the objective of this program has been to provide, at the earliest possible date, an operational 1,500-mile ballistic-missile capability.

The Army gave the Jupiter program the highest priority. Special organization and streamlined procedures were instituted to provide the fastest possible means for producing this important weapon.

The progress made during the last two years has been an outstanding technological feat for which the Army is justly proud. Never before has so much been accomplished within such a short time on a complex new weapons system. I weigh my words when I say that.

The recent decision by the Secretary of Defense to authorize production of the Jupiter IRBM is based on the success of this program. It is remarkable that such a decision could be made after such a short period of development. The operational deployment of intermediate-range ballistic missiles by the United States and our allies will be a strong and major deterrent to any would-be aggressor.

The Army believes that in the missile era another major part of our deterrent strength will be the awareness by the Soviets that any attack launched against us will meet with certain defeat.

For this reason, the Army considers that the development of an anti-intercontinental ballistic missile, sometimes referred to as the anti-ICBM or the antimissile missile, should be pursued with the utmost urgency. The vital necessity of providing an effective defense of our homeland needs no elaboration.

The Army has put an intense effort into Nike-Zeus, an anti-ICBM missile. This project was started several years ago by the Army when our basic development of Nike-Hercules became an assured success.

An 18-month feasibility study by some of the most highly experienced scientists in the missile field convinced us that a defense against the ICBM was both technically and economically feasible.

After more than a year's effort on experimental work, we are now in the stage of component development, a necessary preliminary to full-system development.

Senator SALTONSTALL. Mr. Chairman, might I interrupt there?

Senator JOHNSON. Senator Saltonstall.

NIKE-AJAX FIRST IN THE FAMILY

Senator SALTONSTALL. Mr. Brucker, if it would not inconvenience you, could you give us a brief description at this point of the differ-

ence between the Nike-Hercules and the Nike-Zeus, and perhaps the background of the 3 or 4 Nike's?

Secretary BRUCKER. I would be very glad to comply.

They are all a part of what we call the Nike family. The first was the Nike-Ajax, which was developed, of course, several years ago, and came into production and is ringed around the cities and industries and the towns of the country, with which the people are well informed.

The next development of that was the Nike-Hercules. That might be called the second-generation Nike, and that, of course, without dealing with security matters in detail, improves very greatly the Nike family's reach, height, and lethality, and other elements that I might mention in terms of generality.

Now, the third generation or the third step in the Nike family is the Nike-Zeus, which is the antimissile missile or the anti-ICBM, as it is sometimes called. That is an extension beyond the Hercules out a great deal further in the area of incoming missiles.

And I may say to you, Senator, that the general characteristics of that are such a magnification and such an expansion of the same Nike-Hercules concept that it will do the job we are ready to do.

Shall I proceed?

Senator SALTONSTALL. Thank you.

Secretary BRUCKER. Motivated by the urgency for a ballistic-missile defense for the United States, and our success to date, we have made a study of how we could accelerate the Nike-Zeus program. On the basis of these studies, we feel that Nike-Zeus will provide this country with a defense against the ICBM. We have made great strides in the fields of IRBM's and anti-ICBM weapons systems.

The Soviet's recent satellite successes have emphasized the importance of conquering the problems of outer space. It is imperative that we now demonstrate to the free world our capabilities in the field of satellites and space vehicles. We must undertake a military, as well as a scientific, program that will accomplish far-reaching scientific advances into space.

The Army has a unique capability to make significant and early contributions in this conquest of space. It has not only the ability with existing equipment to begin launching small satellites almost immediately, but it has an incomparable reservoir of experience in rockets, guided missiles, ballistic missiles, and space vehicles.

Two outstanding Army organizations in these fields are Dr. von Braun's team at the Army Ballistic Missile Agency at Huntsville, Ala., and Dr. Pickering's team at the Jet Propulsion Laboratory of the California Institute of Technology. Both of these teams have been doing outstanding pioneering work in the field of missiles and are highly competent in the space field. As you already know, the Army has been directed to launch a satellite early next year in support of the Vanguard program and the scientific objectives of the International Geophysical Year.

ARMY PROPOSES TO LAUNCH LARGER SATELLITES

Beyond this, the Army has proposed an integrated program for the development and launching of far larger satellites for scientific applications. We are ready, willing, and able to embark upon these and

other long-range programs with resources that augur well for success. These two Army scientific teams have the capacity and competence to undertake an ever-widening spectrum of projects, and I weigh my words when I say that.

Without in the least underestimating the threat of Soviet scientific achievement, another Soviet threat deserves attention at this time. It is the strong threat on the ground. No one who has read or heard about the November 7 Communist parade in Moscow could mistake the growing modernization of the Soviet ground army and its ability to fight a nuclear war. Our people should be sharply alerted to this threat. A nuclear stalemate becomes an ever-increasing possibility with the advent of nuclear plenty and more advanced technology. Certainly, neither nation will initiate a global nuclear exchange that would result in its own destruction. Limited war on the ground remains the most probable immediate threat to the security of this Nation and its allies. We must give at least as much attention to the forces we are likely to use as we give to those forces which we hope never to use. I urge accelerated efforts to meet this threat in all of its manifestations.

WELFARE AND SECURITY OF ALLIES CRITICAL QUESTION

The fact that Communist armies cannot reach our shores does not mean that those armies are not a threat to our survival. The United States has only 6 percent of the world's population, and depends upon outside sources for many of its strategic materials. It logically follows that our future and our fortunes are wrapped up in the welfare and security of our allies. It is precisely here that Army forces have a direct and unique function.

If we did not have Army forces deployed or quickly deployable at any threatened point along the Iron and Bamboo Curtains, the Communists could nibble away at the free world with impunity. We cannot withdraw to a Fortress America, cock our long-range missiles skyward, and abandon collective security. We cannot abandon, to the Communists, our allies with their vital lands, their industries, their scientific resources, and their desire to be free. It would be national suicide for this Nation to retract its forces to the confines of the North American Continent where they, together with our people and our industries, would constitute an extremely vulnerable target.

Enemy forces moving unopposed on the ground, particularly under cover of darkness, can remain dispersed and mingle almost indistinguishably with civilian and refugee populations, so that they are difficult to locate and nearly impossible to destroy. It is only when invading forces are opposed by Army forces on the ground that military targets take form and atomic firepower can become effective. This serves to illustrate the importance of the Army's role in a balanced, tridimensional force which is indispensable to victory.

The Army not only has a vital role now but, in my opinion, an increasingly important one in the future. I can only reemphasize that the kind of military conflict which is the most probable in our time is the kind of conflict in which Army forces would play a leading role.

Mr. Chairman, with this brief statement of general principles, the representatives of the Department of the Army, General Taylor and

others, are ready to answer your inquiries into the fields of missiles and satellites and related fields pertaining to the military strength of the United States.

Senator STENNIS (presiding). Mr. Secretary, we thank you. As always, you have made a good statement.

We will proceed right along now, gentlemen. I call on counsel to proceed with his questions.

Mr. WEISL. Mr. Secretary, in view of the fact that your very able staff, each of whom I have interviewed, will answer the details of what you have put in your fine statement, I don't believe I want to ask you any questions.

Senator STENNIS. Senator Saltonstall?

HISTORICAL ROLE OF ARMY IN BALLISTIC-MISSILE AREA

Senator SALTONSTALL. Mr. Brucker, you have overcome me, because you have overcome the counsel. Let me ask you just about 1 or 2 questions. Do you believe that the Army, which we all consider essential to the future defensive purposes of our country, has a fundamental part in developing a ballistic missile and a part in developing the ballistic-missile program?

Secretary BRUCKER. I most certainly do; emphatically so. As a matter of fact, the Army has been in this business for many years now. Growing out of our natural artillery mission that began with ground-to-ground fire and later developed in the missile field, the Army has attained the competence that, I think, without any effort at bragging or undue emphasis upon it, is really a great part of the deterrent strength of this country at this moment. So my answer is, "Yes; I do feel that the Army has that part."

Senator SALTONSTALL. Do you feel if it has that part; that it should restrict its research and development to ballistic missiles or guided missiles that will have a comparatively short range?

Secretary BRUCKER. On that, I would like to say this: I think that the Army and its missile arsenal should have this said with respect to our need and our requirements. We have, of course, the whole range in our arsenal of missiles at the present time, beginning with the Dart and running up to the Redstone, which, of course, is the 175- to 200-mile missile.

I feel that the development in this field has been so marked—particularly since we have seen the visual evidence of it, in addition to other intelligence information that we have received indicating that the Soviets have missiles in the range of the requirement that I am going to talk about now—that it is only logical that the Army should develop the capacity that it has for the requirement that we have. That is the midrange missile that goes beyond 200 miles. The midrange is not occupied by the IRBM, which is in the area of 1,200 to 1,500 miles, but is the range of 500 to 700 miles, which is the range that I shall denominate as the midrange. We are capable and competent to move into this range. Already the army that faces us has this missile. It was paraded by on November 7.

Senator SALTONSTALL. And that is a fundamental part, we will say, of the Army, in your opinion, of a strategic concept—

Secretary BRUCKER. It is.

Senator SALTONSTALL (continuing). Of an instrument that will fire that far?

Secretary BRUCKER. It is.

Senator SALTONSTALL. Now, let me ask you just two more questions. One, there is always a very great controversy as to whether the air defense of a city, tactical air defense of a city, which is now within the overall control of the Air Force, as I understand it, should be given to Nikes when the Air Force has its Tactical Air Force.

Secretary BRUCKER. Senator Saltonstall, may I just make a slight correction there? The Air Force does not have the operational control of the air defense from the ground. The Army has the firing of the ground-to-air Nike Ajax, Nike Hercules, and, of course, the Nike Zeus, when it comes.

And so, from that standpoint, of course, the Army is in its element in the fire from ground to air, which is an extension, of course, of the old antiaircraft with the guns, and now with the missiles.

UNIFIED COMMAND VESTED IN NO SINGLE SERVICE

Senator SALTONSTALL. What I am getting at is the overall command, the unified command in the defense of our country is in the Air Force, is it not?

Secretary BRUCKER. No. It is a unified command in which there is Army, Navy, and Air Force members, each of them members of that command. That overall command is located, as you know, in Colorado, but it is not an Air Force command alone. It is an Army, Navy, and Air Force command, in which, of course, all three participate. Now, all three have a mission in that field.

The Army's part of that mission is to fire the ground-to-air missiles from the defense positions that are stationed all over and around the United States and some other places in the world. There is a very clear defense doctrine that is stated in the November 26, 1956, directive, an enunciated and reconfirmed document.

Senator SALTONSTALL. Are you satisfied or are you critical of the new authority that has been given to Mr. Holaday by Secretary of Defense McElroy for the overall authority of developing the research programs and the development programs in ballistic missiles?

Secretary BRUCKER. We are not critical of the appointment of Mr. Holaday. As a matter of fact, we are working with him in close cooperation. We feel that having a person in authority at that juncture, or that place in the organization, is a step in the direction in which we can cooperate, cannot only live but can work. We are glad to have authority established whereby we, with others, can cooperate to that end.

Senator SALTONSTALL. You used the word throughout "cooperate."

By cooperating you mean that if he exercises that authority by changing we will say your research effort from one type of an instrument to another type of an instrument, and you do not wholly agree with that decision, that you still think, overall, that is a good thing?

THEY WANT THEIR DAY IN COURT

Secretary BRUCKER. Yes, I do. Now we have resort, if we have any question about it, to a method of hearing, and he accords us that hearing. If there is any further matter, I presume we could speak with the Secretary of Defense himself about it. He has the overall authority as a Cabinet officer.

But we can live with that sort of thing and work with it. All we want are the orders and the decisions, and the opportunity to be heard with respect to our case, if anything comes that we are interested in.

Senator SALTONSTALL. And you believe that this order, and all the authority that will go with it by the subsequent orders that will come, will help and will not hurt the accelerated program which we all believe is so necessary?

Secretary BRUCKER. Yes, I do.

Senator SALTONSTALL. Thank you, Mr. Chairman.

Senator STENNIS. Senator Flanders?

Senator FLANDERS. Mr. Secretary, there are two points I wish to raise.

One of them, a question I wish to ask, is this:

Has the responsibility for the development of the antimissile missile been assigned as yet?

Secretary BRUCKER. No. The Secretary of Defense has indicated in a general way, Senator Flanders, that he is moving in the direction of what he calls an agency that is denominated as the Advance Research Projects Agency. It has not been defined, but he says that he intends to have that agency to parallel or to be on the same level with the office which Mr. Holaday heads in the field of the missiles, and that the new agency will be responsible for satellites and spaceships, space vehicles, and matters of that kind.

Senator FLANDERS. That is the assignment for development?

Has there been any discussion as to the assignment operation?

Secretary BRUCKER. No; there has been no discussion on that basis yet.

Senator FLANDERS. Of course when, as and if that discussion arises, it would seem appropriate to me that that should be in the task of the Army, to operate that ICBM.

Whether it will be or not we don't know, but I put that down in the record for my personal opinion right now.

Secretary BRUCKER. Thank you very much.

Senator FLANDERS. One other question and that is this:

In seeking the development so far as it has gone of the intermediate range weapons and the rather elaborate and movable, substantially ground equipment that is required for launching it, it has struck me that there are possibilities in the use of other fuels than those used in the present IRBM and there again I would raise the question as to whether if more nearly complete mobility can be achieved for longer ranges up toward the intermediate range, it would again seem to me to be appropriate to assign those missiles to a mobile army.

So I put myself on record as thinking naturally along those lines with the limited knowledge which I have at the present moment, but I hope that those points will be taken into consideration by the Secretary of Defense in his ultimate determinations.

That is all, Mr. Chairman.

TIME PERIOD FOR LAUNCHING SATELLITE

Senator STENNIS. Thank you, Senator Flanders.

Mr. Secretary, I will be very brief. At the bottom of page 3 you made this statement:

The Army has a capability to make significant contributions in this conquest of space. It has not only the ability with existing equipment to begin

launching small satellites almost immediately, but it has an incomparable reservoir of experience in rockets, guided missiles, ballistic missiles, and space vehicles.

Now, without getting into a discussion of time, and I don't think it is well to do that at all, your statement there with the sentence beginning at the bottom of page 3, the last sentence beginning there, it seems to me leads a casual reader to believe that you are right on the brink of sending up a satellite.

You say almost immediately. You did not mean to suggest days or just a few weeks that you would be taking off, did you?

Secretary BRUCKER. Senator, I would rather not define what I meant by "immediately." I would rather let the action suit the word.

Senator STENNIS. That is what I want you to do, but it looks to me like the words "almost immediately" contemplate just a few days, but I don't suppose that is a correct interpretation, just a few days.

Secretary BRUCKER. No, I am not desirous of having that connotation taken from that context.

Senator STENNIS. Now, Mr. Secretary, I look upon you as a very capable, experienced, and effective member of the Government here in Washington doing a splendid job over in the Pentagon. But on this question here now of creating these authorities here—one as Director of Missiles, the other Director of Spaceships and Satellites—it is hard for me to distinguish between those two and why they should be separated.

Can you? And give a reason for your distinction.

Secretary BRUCKER. I would not want to prejudge the reason why the Secretary of Defense did that.

Senator STENNIS. I did not ask you that, Mr. Secretary. I want your reason.

Secretary BRUCKER. My reason would be that he wanted to preserve a difference between the two because he felt that it would be too great a burden for one man. I think that is what he had in mind.

SAYS THEY ARE OFF IN RIGHT DIRECTION

Senator STENNIS. Are they not so intermingled, though? I know they are different, but is not the problem so closely connected, the whole desire to get this program moving along faster, as you well put it, are not they all so tied together that instead of being divided, they should be consolidated and an overall plan made? Do you not think that, now, as an administrator?

Secretary BRUCKER. There is a very good reason to have Mr. Holaday take on both. On the other hand, this new man, Secretary McElroy, has shown every evidence of wanting to get a job done in a hurry and not putting somebody else with a different layer of authority, and I think that he is leaning in that direction very strongly.

You will notice that he yet has not crystalized it. I think that time will do a lot in that direction in helping him to see his way through it.

Senator STENNIS. As an experienced administrator and a former governor and a successful lawyer, I do not want to embarrass you because you are part of the setup in the Department of Defense, but I just cannot see anything short of absolute authority and power to plan and direct and carry this missile program through.

Mr. Holaday testified a few minutes ago that should there be differences of opinion between him and the Secretary of Defense, that

his directorship stops right there, and he would not feel free to go to the President with his side of that picture. So I say that that proves very strongly to my mind that Mr. Holaday is a Director who cannot direct, but even if he gets over that impediment or obstacle and gets the Secretary to go along, the Director of the Budget can stop him, a wholly unrelated separate independent agency of the Government. The Director of the Budget can stop him.

Knowing this program as well as you do, do you not just as a citizen think there has got to be authority that can move right on over an obstacle like that and carry out this plan, to be effective in the emergency you speak of here in your statement to meet that?

Secretary BRUCKER. Senator Stennis, if it were not for the fact that the Secretary of Defense has such great power, even tremendous—he is a brilliant man and very vibrant and vigorous and wants to move into this field—I would have a great deal of hesitation in not agreeing with you on that. But I know his attitude toward it, the fact that he personally wants to see that these decisions are not only prompt but right. It is not like a baseball umpire calling strikes and balls; he must have the advice of his principal assistants, and after hearing the whole thing in great detail, make the decisions. I think he is wise in taking his time to decide this thing.

Now, as to whether he is going to decide to have another man with this agency or not, I do not know. He could, of course, resolve this when he gets back by coalescing the two under one head and giving him authority. But that is a matter, of course—

Senator STENNIS. You are going back and talking about these two authorities here—the satellites, spaceships and missiles. I was talking about an overall director of all of the program including missiles that would be exercising direct Presidential authority, and that is superior to the Director of the Budget, the Secretary of Defense and everyone else. Is it not going to take something like that to get the job done?

SHOULD NOT INTERPOSE ANOTHER AUTHORITY OVER SECRETARY

Secretary BRUCKER. May I say this, sir: I think that you have that in the Secretary of Defense. I think the Secretary of Defense has supreme power in that field. I think with his entry to the President and the Cabinet, and with all that I have seen with the security and the rest—the legal power that he is clothed with, his ability and knowledge—that is very much better to center the authority in the Secretary of Defense than to put another layer above him. I really do.

Senator STENNIS. I was not passing on the Secretary of Defense. I was talking solely about a system that would be superior and that everybody in the Government would know, and I think that is a big factor, that everyone in the Government would know that this man does have the supreme authority, limited only by the President of the United States. I think that is the biggest point about this: the overall director who has the authority to direct.

You started to say something?

Secretary BRUCKER. I do not want to press the point. All I wanted to say was.

Senator STENNIS. I just want your opinion.

Secretary BRUCKER. My opinion is that if the Secretary of Defense will exercise that power, that with his close proximity to the President of the United States and all of the other agencies of Government here, and with his stature in the Pentagon, and with the knowledge that he is moving in and doing these things—you could not have anything better. Another person there would be a layer in a horizontal way, and you have enough layers vertically without putting another one horizontally.

Senator STENNIS. But with all the duties and responsibilities of the President of the United States, they daily call him to many, many things, even call him to other parts of the world, I know as a practical matter he does not have a chance nor does he have the time to give very much attention to the actual planning or direction of the missile program or any other kind of major program.

I would like to see him lift this thing above all the ordinary realms and clothe this someone with this power, his power to act directly. I believe it would help you and others in carrying out your particular mission.

Senator Bush, you are next.

Senator BUSH. Thank you, Mr. Chairman. I will be very brief, Mr. Secretary. Having just returned from a trip of some 7 weeks in Europe under the auspices of the Army, I was quite interested in your prepared statement, and I congratulate you on that statement.

I also congratulate you on the remarkable condition of our Army in Europe. I was enormously impressed with it.

Secretary BRUCKER. Thank you.

Senator BUSH. With its readiness, with its training, with the quality of the men, with the morale of the men and even their families, with the equipment, with their schools for officers and men, and so on. I think this is probably the most remarkable organization that we have ever had in war or in peace so far as an Army is concerned, or that any nation has ever had. So I can appreciate your concern in having it continue to be the most completely armed and efficiently armed that it possibly can be.

I want to ask you a question which you do not have to answer, but it has not come up yet. Sometime ago I believe the Defense Department placed a limitation on the Army's use of missiles, and limited the use to a 200-mile range.

LIMIT OF 200 MILES ON ARMY MISSILES STILL IN EFFECT

Secretary BRUCKER. That is correct.

Senator BUSH. Is that directive still in effect?

Secretary BRUCKER. It is. It is the directive of November 26, 1956. That is still in effect.

Senator BUSH. Would you care to comment on that at the present time or not?

Secretary BRUCKER. Yes; I will comment on it. That was in the light, I suppose, of events of 1955 and 1956 up until the fall of 1956. And while I am not in position, of course, to be critical or destructive of the Secretary of Defense or the persons that made that order, all I can say is that times have changed a lot since then, and when one thinks back to the climate of what we were thinking about and talking about in those days of the summer of 1956 and what you are

confronted with now—with the Soviet having these intermediate range missiles in their armor, in their arsenals in great number, and with people shooting at us with a range that we cannot shoot back—we are, of course, very eager to answer the question, to say to you that times have changed. We feel that maybe a new look at that some day would be a good thing.

Senator BUSH. Is this a matter that is pending within the Defense Department now?

Secretary BRUCKER. No, it is not pending at the present time. We have accepted it. We do not fight it or resist it. We are doing the best we can. We are living with it. But in the future as things come in, we feel that in this climate it ought to be, of course, re-examined.

Senator BUSH. I take it you feel that events subsequent to the time when that directive was issued—

Secretary BRUCKER. That is right.

Senator BUSH (continuing). Would justify reconsideration of that directive at the present time, with the view to removing it and certainly extending the mileage limitation or in some way loosening up on the situation so that the Army might take advantage of its developments in the field up to the intermediate-range ballistic missile?

Secretary BRUCKER. Yes, we do. We feel that way about it.

ARMY STANDS READY TO DO MISSILE LAUNCHING JOB

Senator BUSH. You feel that way about it. It has occurred to me in looking at this whole problem that there might even be considered a closer working arrangement between the Army and the Air Force. The launching of missiles, after all, has been the Army's job when they are launched from land historically and even to this moment, and I am a little surprised to find that the Air Force is building launching sites to launch missiles when it seems to me that that would properly fall into the responsibilities of the Army.

Would you care to comment on that or not? I do not ask you to.

Secretary BRUCKER. I do not think anyone should fail to comment on things, no matter how personally embarrassing they are to the service. In the sense that we do not want to stir up any controversies, interservice or otherwise, may I just say this about it: We do feel that historically and from the standpoint of our readiness and from the way in which these men are trained, that technically, scientifically, from an engineering standpoint with the backup of all these things that I have mentioned here, the ordnance and all the rest of our mobile concept to back it up—that we are ready and equipped to do that kind of a job, and that we would like to do it.

On the other hand, we respect authority. We are good soldiers. When an order comes and they say 200 miles, that is it. You have not heard anything from us. We have gone back and gone to work and we will say we will work within that. But the time has come when these events have caught up with us. It is all different, a new ball game now from what it was back in the days of that. We are now confronted with somebody who has outgunned us on our own field. I mean by that our field of being able to launch ground-to-ground missiles. And by "missiles" I mean the same as artillery extension in space and time. We feel very rightly, I think, that we do have the competence to do it.

Now, we are not stepping out and advertising, nor do I want here to start the slightest bit of thought that we have a controversy that we are raising with our brothers of the Air Force. We are working as closely as we can with them, and in the fact that the Jupiter missile has been assigned to the Air Force to fire, we are willing to train their forces and to give them all the support that we can. We have gone to great limits to express that. We flew down to Huntsville the other day, the Chrysler plant in Detroit the next day. We are going Sunday and Monday to the other coast. We are willing to go to great lengths in training them as far as we can. Of course, they are not used to it. We realize that. But we are willing to overlook that and to help in any way we can, because the people do not care who does what, so long as the country gets the missile and gets it fired.

Senator BUSH. You feel it would be logical, though, for the Army to be charged with the responsibility of launching missiles from the ground?

Secretary BRUCKER. We most certainly do.

Senator BUSH. I want to make clear for the record, Mr. Chairman, that nobody has prompted me to ask these questions of the Secretary. These questions occurred to me while I was in Europe and they occurred to me while I was in the West with my good friend, Senator Flanders, and two other Senators, where we discussed these matters with Air Force people and so forth, and got briefed on this whole business of launching missiles. And it occurred to me, not from any suggestion that was made by anybody but just as a reasonable thing: Why are other services in this ground-launching business which really, it seems to me, is particularly the responsibility of the Army? Are we going to have some new ground forces now that are not in the Army? I mean it seems to me we are complicating the situation further by moving in that direction.

Senator FLANDERS. Will the Senator yield?

Senator STENNIS. Will the Senator yield?

Senator BUSH. Yes; I want to yield to the Senator. But that is why I brought this up. I want to make this very clear. I have not discussed this with any Army officer or the Secretary or any of the Army people.

Senator STENNIS. I believe the Senator made a good statement. Senator Flanders.

Senator BUSH. I would like to yield to the Senator from Vermont here.

Senator FLANDERS. It strikes me the principle which was just put into words a few minutes ago of a mobile weapon for a mobile army should be the determining factor, and we saw weapons out there that were movable but not mobile, and I think that is where the distinction should be made.

I wonder if the Senator agrees with me?

Senator BUSH. I think that mobile weapons for mobile armies is fine, but I do not include the fact that weapons such as the Nike, which is fired from a fixed site, should not be the business of the Army.

Senator FLANDERS. I would not want to discuss what I have in mind except in executive session, Mr. Chairman.

Senator STENNIS. All right. Any other questions?

Senator BUSH. No, Mr. Chairman; I think that is about all. I am grateful to the Secretary for his impromptu observations on this. I think he has got a good deal of merit on this side in his argument.

Senator STENNIS. The counsel has a question.

Mr. WEISL. In order to straighten this out, I did ask Secretary McElroy, who testified, why it was that the Army would not be permitted to use the Redstone missile if it had a range of over 200 miles; and he stated that that was being reconsidered.

Secretary BRUCKER. Thank you.

HOLADAY HAS NO POWER TO ASSIGN FUNCTIONAL ROLE

Mr. WEISL. I would also like the record to show, if you agree, Mr. Secretary, that while the directive of Mr. Holaday is to direct the missile program, he has no right under that directive to assign to the Army a missile whose range exceeds the mission of the Army; is that right, Mr. Secretary?

Secretary BRUCKER. That is right, he has no power to do that.

Senator STENNIS. Mr. Secretary, we certainly do thank you for your testimony, and we hope that you can stay with us while we have General Taylor and General Gavin, but, of course, if other things come up, you do not have to stay.

Our next witness, members of the committee, is Gen. Maxwell Taylor, Chief of Staff of the Army.

General Taylor, you are a man of tremendous experience in the military field. You have led our soldiers into battle in two different wars and hold some of our country's highest decorations.

Missiles, which is the subject of this hearing, are ultimately designed to be used by the armed services. This brings to you all the problems of reorganization that always go with new weapons. We would be very interested in hearing your discussion of these problems. We are also interested in how you cooperate or propose to cooperate with the other services.

In order to save time, I would like to place your biography in the record. It is a distinguished biography and we are fortunate that America has such dedicated men as you, and I have enjoyed reading over recently here in the last few minutes, General Taylor and members of the committee, this splendid biography here and I commend you most highly for such a splendid record.

(The biography referred to is as follows:)

GEN. MAXWELL DAVENPORT TAYLOR, UNITED STATES ARMY

Gen. Maxwell D. Taylor was sworn in as Chief of Staff, United States Army on June 30, 1955 after a long and brilliant military career.

General Taylor was born in Keytesville, Mo., August 26, 1901. He graduated from the United States Military Academy, No. 4 in the class of 1922, and was commissioned a second lieutenant in the Corps of Engineers.

From 1922 to 1940 General Taylor had many important assignments both at home and abroad. He attended and graduated from the Command and General Staff School and the Army War College.

In December 1940, he assumed command of the 12th Field Artillery Battalion at Fort Sam Houston, Tex. In July 1941, he returned to Washington, D. C., for duty in the Office of the Secretary of the General Staff, where he remained until July 1942, when he was transferred to Camp Claiborne, La., as Chief of Staff of the 82d Infantry Division. In this capacity, he personally assisted in the development of the first airborne divisions of the Army, becoming Artillery Commander of the 82d Airborne Division on December 4, 1942.

He went overseas with his division in March 1943, and took part in the Sicilian and Italian campaigns. In March 1944, he became commanding general of the 101st Airborne Division, which he led in the airborne invasion of Normandy on June 6, 1944; the airborne invasion of Holland on September 17, 1944, and the campaigns of the Ardennes and Central Europe.

In September 1945, he returned to the United States for duty as Superintendent of the United States Military Academy at West Point, N. Y.

In January 1949, he was assigned to European Command headquarters at Heidelberg, Germany, as Chief of Staff, and the following September became the first United States Commander, Berlin.

He was appointed Assistant Chief of Staff for Operations, G-3, in the Department of the Army, February 13, 1951. On August 1, 1951, he became Deputy Chief of Staff for Operations and Administration of the Army.

He was appointed to succeed Gen. James A. Van Fleet as commanding general Eighth Army in Korea, and assumed command on February 11, 1953. Under him, the Eighth Army engaged in some of the bitterest fighting of the Korean War, and until the armistice was signed on July 27, 1953. Under his supervision, the Republic of Korea Army was built into a 20-division force.

On November 20, 1954, he was placed in command of all Ground Forces in Japan, Okinawa, and Korea when he took command of the combined staffs of the United States Army Forces, Far East, and Eighth Army, with headquarters at Camp Zama, Japan.

On April 1, 1955, he was named commander-in-chief of both the Far East Command and the United Nations Command and served there until he was made Chief of Staff of the United States Army.

General Taylor has received numerous decorations for bravery and heroism including the Distinguished Service Cross, Distinguished Service Medal, the Silver Star, the Legion of Merit plus many foreign decorations.

Senator STENNIS. We will be glad to hear from you now and I will ask committee counsel to start the questioning.

TESTIMONY OF GEN. MAXWELL D. TAYLOR

Mr. WEISL. General Taylor, each of the services now has guided missiles which are operational, and is developing other missiles. Would you tell us in somewhat greater detail what is the Army's interest in the missile field?

General TAYLOR. The Army has been interested in missiles for a long time. If the committee is interested in a little history, I might say that that interest started in 1812. We were on the receiving end of rockets then from the British forces who fired rockets at us both in the area of Baltimore and also in the Battle of New Orleans. I am quite sure that was the goad to us to take advantage of the possibilities of rocketry, so that in 1846 we had a rocket battery in the American Army which took part in the Mexican War.

The advent of the rifled cannon rather put the rocket out of business because of the increased accuracy, so it was not again until World War II that the Army really moved forward in the rocket field. We were impelled to these efforts by the evidences of success on the part of the Germans. I stood in the front lines at Holland and watched a V-2 launched from a mobile launching site not far from the front line headed for London, and regretted the fact that we had no such weapon with which to respond, although we did have, of course, the bazooka and small caliber rockets in World War II.

Following World War II we immediately took as a prime objective the assembly of the very able German rocket experts from Peenemunde.

That action, of course, was the origin of the Dr. von Braun group working with us now.

Simultaneously, we recognized that our antiaircraft artillery must take advantage of the rocket principle, that in a very short time the performance of aircraft would exceed the capabilities of conventional antiaircraft artillery.

So side by side we have brought forward the surface-to-surface missile and the surface-to-air missile to their present important position in the Army arsenal today.

It was the pictures from the Soviet November 7 Parade, however, which reminded us that just as in World War II the enemy have rockets for which we had no counterpart. In the mid-range field it is quite apparent now that the Soviet forces also are equipped with a rocket to which we have no direct response.

So I would sum up by saying that it has been a natural transition from so-called conventional terrestrial artillery to surface-to-surface missile. Similarly, an easy transition from antiaircraft artillery to our Nike family which is now appearing in its second version, the Nike-Hercules and which we hope will be followed by the Nike-Zeus which has been described by Secretary Brucker.

Mr. WEISL. General Taylor, is it not a fact that surface-to-surface missiles and surface-to-air missiles are really an extension of artillery, in principle?

General TAYLOR. That is correct, sir.

Mr. WEISL. Now, field artillery and the antiaircraft artillery has been in what branch of the military service over the years?

General TAYLOR. In the United States Army.

CONFIDENT OF ABILITY TO PRODUCE ANTIMISSILE MISSILE

Mr. WEISL. With that in mind, General Taylor, do you not think you ought to tell us about the Army's experience and capabilities in the field of guided missiles?

General TAYLOR. I have perhaps in my opening response to the first question outlined in very general terms the experience we have acquired. The Nike-Ajax was the first operational surface-to-air missile in the world that we know anything about. You have evidence of its presence around our principal cities today. We have built on the Nike-Ajax principle and brought forward the Nike-Hercules, which, as Secretary Brucker says, has greater height capabilities, range capabilities, and also has a more lethal warhead, and from there I am quite confident of our ability to move forward into antimissile-missiles field, and produce a missile which would meet all requirements of manned aircraft and missiles.

I might mention at the same time our low level surface to air missile, the Hawk, which is necessary to take care of the very low flying airplanes which cannot be coped with by other types of missiles. In my judgment, it is reasonable to forecast a combination of the Nike-Zeus and Hawk, which would be as nearly an optimum air defense as we can imagine at the present time.

Now, similarly in the surface-to-surface field, we have developed and have in use missiles of a wide variety of ranges, some only a few thousand yards in front of our lines deliberately made short range to cope with the immediate battlefield target.

Then the longer range corps-type weapons, at the present time the Corporal 75-mile missile to be replaced later by the Sergeant,

which will be an improved version. Then we have the Redstone which has been mentioned, which reaches out to 200 nautical miles.

We are very much interested, as both the Secretary and I have indicated, in closing the spectrum gap between the Redstone and the 1,500 mile IRBM, in which category the Jupiter is the Army representative.

Mr. WEISL. Have you any plans or proposals, General Taylor, for the development of a midrange missile?

General TAYLOR. We have, sir.

Mr. WEISL. What are those plans, sir?

General TAYLOR. It is actually a double-barreled proposal. One derives from a scientific breakthrough on the part of our people at Redstone who now see the possibility of taking the Redstone missile itself and giving it greater range. It would not like to go into technical details.

This modernization of Redstone is the first step. Then as the longer-range step, we would go for a solid propellant missile of a very light weight which would have great mobility and also have extended range. We have such a proposal which we think is feasible.

Mr. WEISL. And you would rather discuss that proposal in detail, if necessary, in closed session.

General TAYLOR. It should be in closed session.

Mr. WEISL. While our inquiry, General Taylor, deals primarily with ballistic missiles and satellites, I wonder if you could tell us what effect the emphasis on missiles during recent years and at the present time has on other Army plans and requirements?

CONVENTIONAL ARMAMENT PROGRAMS HAVE SUFFERED

General TAYLOR. We have found our missile programs have lived up to their technological expectations, but unfortunately they have come very high in dollar costs. So within the comparatively limited budgets we have had to work with, to a large extent we have had to pay for the missile program out of what you might call conventional equipment.

I am always disturbed by that, and each year try to strike a reasonable balance so we can be sure of replacing our equipment, which is not in the missile category, at a reasonable rate.

I have always emphasized that the Army should have an unconventional-conventional capability, an unatomic-atomic capability, because there are many situations in which these missiles cannot be used.

Mr. WEISL. General Taylor, can I ask you, within the limits of security, of course, whether you would care to advise the committee concerning the Army's concept of the mobile deployment of the Jupiter and the Redstone?

General TAYLOR. We have always thought in terms of a mobile missile. I think that is instinctive, because all of our equipment is mobile and we are not interested in equipment that cannot be moved from place to place.

We have actually packaged the Redstone on this basis, and the Jupiter offers no greater problem in giving mobility to it. By "mobility," of course, I mean breaking it down into loads and hauling to most places. There are degrees of mobility in all things, but it is highly important, in my judgment, to be able to deploy these weapons

in remote places where they can be protected themselves, and also where they will not draw fire on cities and important installations.

Mr. WEISL. And you believe, General Taylor, that the Army, based on its long experience in moving heavy weapons, is capable of doing that job?

General TAYLOR. I am sure it can.

Mr. WEISL. In view of what you know, General Taylor, about the capabilities of the Soviet Army, are you satisfied with the capability of your Army?

General TAYLOR. I have always had occasion to say that any Chief of Staff who is satisfied should be fired, and I am not satisfied with the present Army, in spite of the kind remarks made by Senator Bush.

I have estimated we need over \$400 million for new equipment in our pentomic divisions. That could include some items in the missile field, but not necessarily all. Modernization comes very high, and necessarily we are going to have to face this requirement in accordance with the budgets available to us.

Mr. WEISL. Could you give some estimate, General Taylor, if possible, as to the relative rate of the modernization of the Soviet Army as compared to our Army, provided it is within the realm of security to do so?

RUSSIANS TACTICAL MISSILES HAVE RANGE EXCEEDING OURS

General TAYLOR. It is very difficult to make accurate comparisons, but we know that the Soviets have replaced most of their World War II equipment of any importance since World War II.

For example, they have a new line of artillery, tanks, trucks, of what we would call conventional equipment.

Then we know they have been very active in the missile field, and the pictures of the November 7 parade have confirmed the fact they have tactical missiles of varying ranges to include ranges beyond those presently available to our Army.

Mr. WEISL. Are there any further matters, General Taylor, about which I have failed to ask you, that you think this committee ought to know?

General TAYLOR. I think the counsel is a very effective cross-examiner, and I will make no suggestions.

Mr. WEISL. I want to tell you, General Taylor, that I have interviewed all of your staff, and each of them has made a very deep and lasting impression upon me as to their ability and their dedication to their duties.

General TAYLOR. In their name, I thank you, sir.

Senator STENNIS. General Taylor, I will be very brief in the few questions I have here, and I have no idea what your answers are going to be in this matter of the Joint Chiefs of Staff, but I do value your opinion.

As Chief of Staff of the Army, you are the man who makes the final decision about what the position of the Army will be with reference to military matters?

General TAYLOR. In the presence of my Secretary, I would be very loath to make that answer.

Senator STENNIS. Well, in approaching a meeting of the Joint Chiefs of Staff, you are the gentleman who makes the decision here as to what

would be the position of the Army on military matters and strictly military planning, is that not right?

General TAYLOR. It is, except I would say, Senator, that I make every effort not to feel I go there as an Army representative. Most of the questions, as a matter of fact, are not purely service questions.

On the other hand, it is quite true that my immediate advisers available to me are Army officers, and their recommendations I pass on.

Senator STENNIS. I know, but you go there as Chief of Staff of the Army.

General TAYLOR. No, sir; I try not to. I try to go there as the Army representative on the Joint Chiefs of Staff.

Senator STENNIS. Well, who goes there as representative of the Army, when the Joint Chiefs of Staff meet; who represents the Army; if you do not, who does?

General TAYLOR. Again, I am sorry to split words, but I consider myself to be two individuals, the Chief of Staff of the Army, the subordinate to Secretary Brucker, in a departmental sense. Then, in another hat, I am a member of the Joint Chiefs of Staff and, as I say, to the extent possible, I try to forget the Army and try to view the whole national problem.

Senator STENNIS. I appreciate your deference there to the civilian authority. You say, if possible, you try to forget the Army. But I do not see how you could, reading your record here in the Army, the time you have been in it, and the distinction you have brought it. Anyway, you are there, and, when matters come up, as you are covering here about the role of the Army, you are the man who speaks for the Army, are you not?

General TAYLOR. At the Joint Chiefs level.

Senator STENNIS. To that extent, you are a witness for the Army, and then you are required to turn around and sit on a jury and make decisions, are you not?

General TAYLOR. Yes, sir; except I would point out again that the vast majority of the questions before the Joint Chiefs of Staff are not service issues.

Senator STENNIS. Well, I am thinking more of this planning now, because I run across this path of roles and missions, and I am not trying to say where they should go; I do not know, but I do know you have quite a job. And someone has got to represent the Army and the Army viewpoint, not only as a witness but as an advocate.

What worries me is then you have to turn around and sit on the jury. I am a lawyer, and I like to use those analogies. Then the jury has got to render a verdict, and there are only three on that jury. Now, that is what disturbs me. Do you not think that system could be improved?

DIVISION OF FUND IS WHAT CAUSES DIFFERENCES

General TAYLOR. I would like to make a statement that would be helpful.

We do have our difficulties in the Joint Chiefs, obviously, although over 90 percent of our positions are unanimous. We do not have our difficulties in the field of military planning, I would say.

Also, I make the point that most of the planning, military planning, war planning, is done by unified commanders, and we approve their plans.

Now, these are straightforward military problems to which we can apply our professional experience and, ordinarily, have no difficulty on agreeing on such plans.

It is rather in the budgetary area, the division of resources, the placing of emphasis as to types of forces, that is where we have very definite difficulties, because they are very hard problems to solve.

But I would not say that military planning, per se, is an area in which the record would show the present system is weak.

Senator STENNIS. Well, Mr. Secretary, I will not belabor this question any longer myself. I understood you have a cold and might have fever, and I do not want to prolong the examination now.

Chairman Johnson had certain questions here, some of which he—

Senator BUSH. Would you yield to a question apropos of your last question?

Senator STENNIS. Yes.

Senator BUSH. The general spoke of unified commanders making recommendations. Just what does that mean? Give us an illustration.

General TAYLOR. The unified commander—General Norstad is our unified commander in Europe. Admiral Stump is our unified commander in the Pacific. General Montague, in the Caribbean.

Senator BUSH. I thank you.

QUESTIONS AS TO THE CHIEFS OF STAFF

Senator STENNIS. There are some questions that Senator Johnson had, General Taylor, some of which pertain to the work of the Joint Chiefs of Staff, the Chairman, and in your two-hat status. Without objection by the committee, I will insert those questions into the record, General Taylor, and you may answer them for the record at your early pleasure.

General TAYLOR. I would be very happy to.

Senator STENNIS. Very good.

(The questions by Senator Johnson are as follows:)

1. Questions have been raised concerning the two-hat status of the Chiefs of Staff who are also members of the Joint Chiefs of Staff. What is your experience in performing both functions—that of Chief of Staff of your service and that of being a member of a joint group responsible for the principal military advice to the Secretary of Defense and the President?

2. Do you find that the delegation of duties to your Vice Chief, as provided for in the reorganization of 1953, relieves you of sufficient time for your duties as a member of the Joint Chiefs of Staff?

3. Has the problem of the Joint Chiefs of Staff having too much paperwork been relieved by the strengthening of the Joint Staff under the direction of the Chairman of the Joint Chiefs of Staff?

4. What difficulties do you encounter in arriving at joint approval of war plans designed to meet the military requirements for all United States commitments?

5. Do you favor that provision in the National Security Act which states that the Chairman of the Joint Chiefs of Staff shall—

“Sec. 211 (e) (3) inform the Secretary of Defense, and when appropriate as determined by the President or the Secretary of Defense, the President, of those issues upon which agreement among the Joint Chiefs of Staff has not been reached.”

6. To what extent are military experts so divided on questions of strategy and tactics that problems primarily involving military operations have to be resolved by their civilian superiors?

7. What are the advantages and disadvantages of split decisions among the Joint Chiefs of Staff? Have you ever had any pressure brought upon you to arrive at unanimous decisions?

8. Do you think the Secretary of Defense should have a military staff to advise him, in addition to the Joint Chiefs of Staff? If not, what suggestion would you make which would enable the Secretary to make wise decisions on matters which are undecided in the Joint Chiefs of Staff?

9. This committee would like you to give these basic problems some deep and penetrating thought and to furnish us with a memorandum covering—

(a) a clear statement of the problem involved in the organization of the military planning function and the relationship between planning and operations;

(b) the proposals which have been made to meet this problem;

(c) the probable repercussions of each proposal;

(d) an analysis of the types of action required for putting each proposal into effect, i. e., legislation, departmental regulation, a reorganization plan, a directive by the President.

(The answers by General Taylor to Senator Johnson's questions appear elsewhere in the record, together with the answers of General White and Admiral Burke in response to the same questions.)

Senator STENNIS. Senator Saltonstall?

RUSSIAN MISSILE WHICH HAS NO UNITED STATES COUNTERPART

Senator SALTONSTALL. General Taylor, I am sorry you are feeling ill, and I will be very brief. You said that the Russians have an intermediate missile for which we have no counterpart. Did I understand you correctly?

General TAYLOR. Midrange, I would say.

Senator SALTONSTALL. Midrange?

General TAYLOR. Yes, sir.

Senator SALTONSTALL. What does that mean; 500 miles?

General TAYLOR. It means something between 300 and 500, perhaps; something of that nature.

Senator SALTONSTALL. You say, in reply to that, that, with the Redstone or with something based on the Redstone, we could, fairly quickly, develop such a missile?

General TAYLOR. We could.

Senator SALTONSTALL. Is the Hawk in production?

General TAYLOR. No, sir; it will be in production this next year.

Senator SALTONSTALL. Is it in the operational stage yet?

General TAYLOR. It is ready to go into the operational stage. Unfortunately, the planned production rate is slow.

Senator SALTONSTALL. What was that?

General TAYLOR. The planned production rate is slow.

Senator SALTONSTALL. Let me ask you just 1 or 2 more questions along the lines that Senator Stennis asked you which interest me.

Is there any legislation, in your opinion, needed for the improvement of the Unification Act? Or is it a question of Executive authority?

General TAYLOR. That is hard to answer, sir, because first we would have to agree what changes we have in mind.

I have been asked by Members of Congress in previous appearances about my position on fundamental changes in the Department of Defense. I have been inclined thus far to say that undoubtedly there are areas in which, it seems to me, improvement should be sought. But I do not have and am not ready yet to table a solution.

I think it takes time and observation and more wisdom than I presently have, to come forward with those points. So until I am sure what proposal I would table, I could hardly say what legislation would be required.

Senator SALTONSTALL. But it has been my feeling that there could be considerable changes made under the Unification Act by Executive order or directive.

General TAYLOR. That is undoubtedly true. And also, of course, I would stress the point that organization will only make the job easier for good men who make decisions; the decisionmaking power of individuals involved is beyond organization.

Senator SALTONSTALL. One more question: Should there, in your opinion, be more authority in the Secretary of Defense?

General TAYLOR. I would say not, within my observation.

SEES SERIOUS DISADVANTAGES IN SEPARATING POSITIONS

Senator SALTONSTALL. Senator Stennis asked you about planning, the military planning in the Chiefs of Staff. I will put the question in this way: Have the present Chiefs of Staff, the Joint Chiefs of Staff, the time and the energy to give to capable planning?

In other words, have you a staff now that is sufficiently free from operational difficulties and operational jealousies, if you will, to give overall unified planning and advice to the Joint Chiefs of Staff?

General TAYLOR. I would say we have the organizational facilities within our respective staffs for the job.

With regard to the individual ability of a Chief to be two people and do the double job, there is definitely a question. I always find that it takes 7 days a week, and still never quite satisfy myself with the work accomplished.

On the other hand, the disadvantages of separating the two positions would be very serious, and for the moment I would prefer to stay with the present organization.

Senator SALTONSTALL. One final question: Are you in favor of the principles enunciated in the Cordiner report?

General TAYLOR. I am.

Senator SALTONSTALL. Mr. Chairman, thank you.

I am sorry you are ill, General.

General TAYLOR. Not at all.

Senator STENNIS. Senator Bush?

Senator BUSH. Mr. Chairman, I think I would rather ask the questions which I have in mind in executive session, of the General. And I take it he will be called later on for that purpose, so I will not ask any questions right now.

Senator STENNIS. General, Senator Saltonstall mentioned here the Cordiner report.

The Cordiner report has had some hearings, but these were not concluded, but they will be just as soon as we can complete them.

You said that you endorsed the principles of the Cordiner report. Now, one of the things the Cordiner report said was if it was carried out, it would save \$5 billion a year within a few years. The American people have been told that many, many times. It has been said in the newspapers and on the floor of the Senate as a conclusion.

But when our subcommittee that I have the honor to be chairman of had Mr. Cordiner before it, who is the only witness we have had so far, and I asked him the question to present the proof about the \$5 billion saving, he said that was not his estimate, he did not make any such estimate as that, and said the Department of Defense supplied that figure.

I just point that out to illustrate here how something is being kicked around all over the Nation, but when called on for proof, why, they did not get down to details.

Now, I did not have a further chance, but I submitted questions to the Department of Defense more than 90 days ago, many questions on this Cordiner report, and up until just a few days ago, they had not been answered.

So before you endorse those principles, we are going to give you a chance to prove them. And I endorse some of them, too.

General TAYLOR. May I say, sir—

Senator STENNIS. But I say some of this was propaganda.

General TAYLOR. I was going to say that the dollar estimate fell outside the question of principle which I endorse.

Senator STENNIS. I am sure it does, but I assure you I will not remain silent when that question comes up except to point out we are open for proof, and we know proof cannot be given on a strict, down-to-the-dollar basis.

But I am in sympathy with a lot of the principles of the Cordiner report, and hope we can get to detailed consideration of them soon.

Senator Saltonstall, do you have any questions?

Senator SALTONSTALL. No. It is too late.

I was just going to say, I though General Taylor was going back to his educational leadership when he drew a distinction between the principles and the actuality. [Laughter.]

INTERROGATIONS BASED ON TESTIMONY AT AIRPOWER HEARINGS

Senator STENNIS. General, the committee—I think the record ought to show that this is a little unusual hour to be in session, and certain members have other things they are compelled to attend to, but Senator Symington had certain questions for General Taylor, and without objection the Chair will insert those questions in the record for Senator Symington, with the understanding that General Taylor agrees that they will be answered in time for the record. Is that all right?

General TAYLOR. Yes, sir.

(The questions by Senator Symington are as follows:)

1. In the airpower hearings, June 18, 1956, you testified:

"If the small war breaks out, we must suppress it promptly, because that small war may easily lead to the great war which we are all trying to avoid."

Do you still agree with that testimony?

So far as the Army is concerned, is it ready and capable to suppress successfully the small wars to which you referred?

How many divisions does the Army have now? Will have at the end of this fiscal year?

How many of these divisions are combat-ready?

How many are adequately equipped with atomic and other modern weapons?

How many divisions, as forces in being, do you need for the many commitments we have?

With the large amount of the Army budget going to point defense with Nike missile installations, do you believe you can modernize your Army for your other missions without significant increases in funds?

2. You testified in 1956 that your budget requirements for fiscal year 1958 "will be greater, primarily because of the modernization factor."

Your testimony was that you would require "around \$12 billion budget, something of that magnitude" for fiscal year 1958.

Do you recall what you did get?

Unless your estimate was padded, or world conditions have materially improved, a cut of almost \$5 billion must have required substantial curtailment in the Army's modernization and structure which you had thought necessary. Is that not correct?

Due largely to cuts by the administration from the original budget submission, the amount appropriated for fiscal year 1958 for the Army was about \$300 million less in new money than for fiscal year 1957.

What effect did this have on your modernization program?

Can you be explicit as to some of the major effects?

3. In 1956 you stated that you had "an open mind" on the question of greater unification among the services (p. 1289). At the same time you were asked whether you thought we had now achieved what General Eisenhower in 1952 referred to when he said: "Our defense program has suffered from lack of far-sighted direction. Real unification of our Armed Forces is yet to be achieved."

Would you point out to the subcommittee your current views on the state of unification in the services?

Do you believe that the defense planning has been improving significantly since General Eisenhower's speech in 1952?

Do you have any recommendations regarding elimination of duplication and improvement in organization in the Defense Department?

(General Taylor's answers to Senator Symington's questions appear elsewhere in the record.)

Senator STENNIS. Any other questions for the general?

Thank you.

Well, General Taylor, we appreciate very much the testimony you have given here, and we know that you have been helpful to the committee, as you always are.

General TAYLOR. I appreciate the consideration shown.

Senator STENNIS. Thank you very much.

We have another witness, and we would be glad for you gentlemen to stay, of course, but we do not require you to stay. You have other matters.

General TAYLOR. I am going to excuse myself.

Secretary BRUCKER. I will elect to stay.

Senator STENNIS. Gentlemen, what is the pleasure of the committee? Anything further?

General Gavin, you are the next witness, please, if you will come around.

General Gavin, along with others, you be sworn.

Do you solemnly swear that your testimony here will be the truth, the whole truth, and nothing but the truth, so help you God?

General GAVIN. I do.

Senator STENNIS. All right; let us have quiet, please.

Do you have some charts you want to use, General?

General GAVIN. Yes, sir; I have.

Senator STENNIS. Let him get them ready.

Mr. WEISL. May I proceed, Mr. Chairman?

Senator STENNIS. Here is something for the record.

Our next witness is a very distinguished combat soldier, Lt. Gen. James M. Gavin, Army Deputy Chief of Staff for Research and Development.

General Gavin, from the missile standpoint we feel that in you we are getting to men that actually do the work. Plans are necessary but somebody has to do the job, and for the Army, you are it.

Again, I would place your biography in the record. You have a very distinguished career. Americans can very well be proud of such dedicated and competent service and leadership.

(The biography of Lt. Gen. James M. Gavin is as follows:)

LT. GEN. JAMES M. GAVIN

General Gavin is a native of Mount Carmel, Pa., and was born March 22, 1907. He graduated from the United States Military Academy on June 13, 1929.

He held several important assignments until August 1940 when he became an instructor in the Department of Tactics at the United States Military Academy.

In 1941, he attended and graduated from the Parachute School. In September 1942, he went to Europe in command of the 505th Parachute Infantry Regiment. Under his command the 505th Parachute Combat Team spearheaded the assault of Sicily.

In October 1943, he was appointed assistant division commander of the 82d Airborne Division. The following month he went to London, England, as airborne adviser to the supreme commander. He remained on duty with the Supreme Allied Command until February 1944.

As assistant commander of the 82d Airborne Division, he participated in the parachute invasion of Normandy on June 6, 1944. He assumed command of the division in August 1944, and shortly thereafter commanded the airborne operation in the vicinity of Nijmegen, Holland. He retained command of the 82d Airborne Division throughout the remainder of the war, participating in the Battle of the Bulge and the spring offensive in 1945.

In July 1945, he served as American representative on the city Kommandantura in Berlin, in addition to his duties as commander of the 82d Airborne Division. In December 1945, he returned to the United States where he commanded the 82d at Fort Bragg until March 1948.

He was then appointed Chief of Staff of the Fifth Army at Chicago, Ill., until April 1949, when he returned to Washington, D. C., as Army member of the weapons systems evaluation group in the Office of the Secretary of Defense.

In June 1951, he went overseas as chief of staff of the Allied Forces in southern Europe. In December 1952, he assumed command of the United States VII Corps in Germany. In March 1953, he was named G-3, Department of Army, Washington, D. C.

In March 1955 he was designated as Deputy Chief of Staff for Plans and Research of the Department of the Army.

On October 10, 1955, he was appointed Chief of Research and Development with status as a Deputy Chief of Staff.

He has been awarded many decorations including the Distinguished Service Cross with oak-leaf cluster, Distinguished Service Medal; Silver Star with oak-leaf cluster; Bronze Star Medal with oak-leaf cluster; and the Purple Heart.

Senator STENNIS. General Gavin, we are very glad indeed to have you here. I do not know whether you have a prepared statement or not, but do you?

General GAVIN. No, sir; I do not have a prepared statement.

Senator STENNIS. All right. Questioning will proceed and I will ask committee counsel to start the questioning.

TESTIMONY OF GEN. JAMES M. GAVIN

Mr. WEISL. General Gavin, in the course of your duties and responsibilities, have you made a study of the capabilities of the Russian Army?

General GAVIN. Yes, Mr. Weisl, I have; and I do, and we keep currently abreast, as abreast as intelligence will allow, of the Soviet Army.

Mr. WEISL. Have you also made a study of the recent pictures that were displayed on November 7 of the various pieces of equipment in the Russian Army?

General GAVIN. Yes, we have. As a matter of fact, it is currently intensively underway.

Mr. WEISL. Within the limits of security and national interest, the judgment of which I must leave to your discretion, would you tell the committee what your conclusion is as to the capabilities of the Russian Army?

General GAVIN. Yes, sir; I will.

May I say that we have a mission given to us to carry out, and with that mission, and awareness of a most likely opponent, we get on with our programs.

We have not seen a great deal of the Soviet Army's newest equipment. We have been aware that they have been conducting missile development programs, and quite a few nuclear tests, and until November 7, or the 40th anniversary of the revolution, we really did not see much of their newest equipment and we did on that occasion see a great deal, a quite spectacular display of it in fact. I have here a few pictures that have been in periodicals that I would like to use, if I may, for a few moments.

Senator STENNIS. Certainly, General.

General GAVIN. I will stay right here, and Col. F. G. White of my staff will assist in showing you this material.

Senator JOHNSON (presiding). Proceed.

SIGNIFICANT IMPROVEMENT IN SOVIET WEAPONRY

Mr. WEISL. Proceed, please, General Gavin.

General GAVIN. Yes, sir; I will.

These pictures were released by the Soviets to periodicals worldwide, and they symbolize rather remarkable progress in a number of areas.

This first is an artillery rocket. Most people are familiar with the old Katusha Minenwerfer and Nebelwerfer, the rocket launched in World War II. This is a significant improvement over that, much longer. It has a helical spiral along the side to give it spin in flight and thus stability in flight. It appears to be quite an improvement over the old one.

May I have the next, please.

This is the first public display of the surface-to-air missile that may well be the most significant missile that we saw on that occasion. It appears from this configuration to be capable of carrying a nuclear warhead. It is a two-stage rocket. It is carried on a mobile launcher, so it goes with the field forces wherever they go and, of course, also could be emplaced about sensitive areas and the like of that.

Next please.

Mr. WEISL. General, you do not mind my interrupting?

General GAVIN. Not a bit, sir.

Mr. WEISL. Can you tell from the picture what the range of that missile is?

General GAVIN. We can make an estimate of the range, and it would be in the order of about 25 miles or so.

Mr. WEISL. Have we anything like that type of launching equipment in our army or in any of the services?

General GAVIN. Yes, we have launching equipment somewhat like that. I would say we have done quite well in the surface to air field, compared to the Soviets. However, this is what they choose to show us.

Senator SALTONSTALL. Did you say that was ground to air?

General GAVIN. Yes, sir.

Senator SALTONSTALL. Ground to air, not ground to ground?

General GAVIN. No, sir, ground to air.

This is quite significant because it is a ground-to-air missile which we have not seen before, Senator Saltonstall.

Next please.

Senator BUSH. Could I ask a question there, Mr. Chairman. Is that missile there a what you call a guided missile or ballistic missile?

General GAVIN. That is a guided missile.

Senator BUSH. Guided missile.

General GAVIN. Now, of all the missiles, I suppose that those that impressed us most are those we will have to fight in the Army. We have deployed overseas troops in armies now, and as a former member of the Seventh Army, I am most grateful for your kind comment, Senator Bush. But it faces us. Here is a tracklaying launcher with a missile aboard. That long-shaped onion shape nose, with motor and fins could have a nuclear warhead. It is a mobile rocket, somewhat on the order of the Honest John.

RUSSIANS, 50-MILE MISSILE ROCKET HAS EXCELLENT CAPABILITY

Next, please.

This is a rocket of about 50 miles range. In the front you see a screen that apparently is designed to protect the nose when traveling through woods and brush. Around it is a blanket which suggests a solid propellant with a temperature sensitive motor and needs temperature control around it. The nose, too, needs particular attention. That screen was not around the nose of the shorter range rocket. This is about a 50-mile rocket and it would be exceedingly useful in a division, certainly much longer than anything we have in the Infantry division today.

Next please.

This is about a 100-mile rocket, again you see the characteristic shield to protect it. The launcher is aboard, the cabin underneath for the crew, and I would presume some check-out equipment. This, too, is very original. Note that it is also a tracked vehicle.

Incidentally, the one I described as similar to our Honest John is on an amphibious launcher and can cross rivers and lakes and the like, which is very good for a missile of that type.

Next, please.

Senator SYMINGTON. May I ask a question for clarification? Is this Russian equipment you are showing us?

General GAVIN. Yes sir; this is Russian equipment.

Senator SYMINGTON. Thank you.

General GAVIN. They have kept this equipment, as a matter of fact, within the Soviet geographic area. It has not been seen in the satellite areas and we have not seen it until they chose to show it to us.

It is interesting, too, they did not show us any of the associated ground equipment such as radars and computers and equipment that must go along. They just paraded these missiles.

Senator JOHNSON. What did your intelligence say about this? Did we have reports of this before they chose to show it to us?

General GAVIN. We knew they had a family of missiles in these categories. I was personally surprised by the efficiency, uniqueness, and design in the full tracked gear and the mobility of the system.

WE HAVE NO COUNTER FOR THEIR 350-MILE MISSILE

Senator JOHNSON. So again perhaps we were underestimating?

General GAVIN. Yes; that is true.

This is at least 350 miles in range, a huge ballistic missile, with a full tracked prime mover and crew. Note the field trailer and launcher, to go with the field army.

This particularly disturbs me in my present position of responsibility because our army deployed overseas has neither a missile that can counter-engage this by firing at the sites nor does it have a missile that can defend against it. So defense must now be passive until we acquire a greater capability than we presently have.

Next please.

These are comparable in size to the 280-millimeter gun that we have overseas. You will notice they are on track laying carriers. When these guns passed by the reviewing stand, the announcer speaking in Russian said, "This is our new ramjet artillery." We do not know whether he meant that or not. They may well be. But they are rather extraordinary in their improvement over anything that we have known in the past in the size of the tube on a track laying vehicle, and the suggestion in looking at the lack of heavy recoil there is the suggestion of some sort of unique propulsion system associated with the projectile.

Mr. WEISL. What would the range of that cannon be?

General GAVIN. Sir, I would hesitate to guess on that without going into too much classified material. On analysis I think we could get you a rather good figure, but this gets into ammunition and the gun itself. It is certainly greater than what you would normally get out of a gun of this caliber, in my opinion.

Next please.

These are the more ordinary things. Nevertheless, they show improvement, too. This is the multiple rocket launcher that up to now we have only seen on ordinary trucks, but here they designed a full tracked vehicle for it with a cabin for the crew.

Next please.

This is the new heavy tank. You know the JS-3, the Joe Stalin, was a famous tank. I saw a lot of them in Berlin following World War II, and it was an impressive vehicle of about 60 tons. I must say meeting a 60-ton tank is quite an experience for a combat infantryman. This tank has a 122-millimeter gun. As you see, it is very clean, very sharply angled, and all in all, a very good all around fighting tank. It is known as the T-10, a new heavy tank.

This is a 57-millimeter twin antiaircraft gun.

Now, anybody who has fought antiaircraft guns in ground combat in the past knows that a 20-millimeter flak wagon was a favorite of the Germans against us and very unpleasant to deal with. This jumps to 57 millimeters and is a nice-sized weapon.

Note the turret, clean, a bit of protection with a slope on top, a radio aboard the vehicle, the antenna is sticking up, and all in all it looks like a good fighting vehicle.

Next please.

This is the first view we had of their amphibious infantry carrier. This carries 15 combat infantrymen, is full tracked for good cross-

country mobility and it also swims. Now, they have married a missile to it and it also is a missile carrier for one of the other missiles.

Next please.

THEIR TWIN TURBINE HELICOPTER LARGER THAN ANY OF OURS

And this is the last of the pictures which I have been allowed to bring here. This they did not, of course, have in the parade, but they chose to show it to us about the same time. It is a twin turbine helicopter. It has a payload of somewhere between 10 and 13 tons. It is aerodynamically much cleaner than anything shown us before. Note the molded fuselage about the engines, and up around the nose. It is a very trim looking, efficient looking vehicle, as we can judge. We have movies of it flying, of course. It is, of course, much larger than anything we have.

Our best program so far is a single turbine helicopter. This is a very impressive looking vehicle in this category.

That concludes this.

Senator SALTONSTALL. What would be the range?

General GAVIN. I am estimating, sir, but I would say about 200 miles.

Senator JOHNSON. How does this compare with the new jet model that Bell is producing?

General GAVIN. You mean the single turbine helicopter I mentioned, the H-40? The Army, in fact, has been the sponsor of the development of this helicopter and Army procurement is already well underway. I would say perhaps this is ahead of the H-40.

Senator JOHNSON. What is the speed of this one?

General GAVIN. Again I am estimating, but I would say on the order of about 140 knots. It is very fast. The twin turbines are much faster.

Senator JOHNSON. I flew in one yesterday at 100 miles an hour and they passed me like I was standing still and I asked the speed of it and they said about 150 miles an hour.

Senator BUSH. Do I understand the general has been in Russia and has seen these pieces of equipment shown here?

General GAVIN. No, sir; I have not been in Russia and I did not see this personally. I did make reference to being in Berlin. I occupied Berlin immediately following the war for about 3½ months where I was a member of the Kommandantura and thus in close association with Marshal Zukov and his entourage. I attended reviews with them and saw a lot of their equipment.

Since the war I have been back and spent a year and a half with the VII Corps in the Seventh Army. This was just about 4 years ago; I have been to Berlin and have seen a great deal of their equipment and I am familiar with it, but I did not see these identical items.

Mr. WEISL. These pictures were published, were they not?

General GAVIN. These pictures were published in the American press. People do not pay much attention to it, but I must say we are impressed.

NONE OF RUSSIAN SURFACE-TO-SURFACE MISSILES IN THEIR AIR FORCE

Mr. WEISL. General Gavin, in the interests of security of which you shall be the judge, what other equipment, in the area of missiles does the Russian Army to your knowledge possess?

General GAVIN. Well, the Russian Army possesses a family of surface-to-surface missiles, as far as we know, out to, well, they have announced an ICBM range which we, I believe, have accepted. All missiles except those in the Soviet Navy are in the Soviet Army.

Mr. WEISL. None of the missiles are in the Soviet Air Force?

General GAVIN. None, to my knowledge.

Mr. WEISL. Now, based upon your knowledge and information of what the Russian Army possesses, what capabilities do the Military Establishments of the United States possess, in your judgment, again within the limits of the national interest, to meet that capability, either in an all-out war or in a limited war?

General GAVIN. Well, let us take the second first, that is, the short close engagement and to which you refer as a limited war, the tactical engagement. We have a very fine Army deployed in Europe, the Seventh Army, and the Eighth Army in Korea. They are well equipped, as well equipped as our present program will allow us to equip them. I think that these armies are facing a very tough and ready foe as these pictures will illustrate.

In my personal opinion, this equipment is superior in a number of respects to equipment now in our armies deployed overseas.

Mr. WEISL. Is our Army working in research, both basic and applied, to build better weapons?

General GAVIN. Yes, we are.

Mr. WEISL. Are you satisfied with the speed and the development?

General GAVIN. No, sir, I am not satisfied. I am not satisfied for the reasons that General Taylor said that a chief of staff is never satisfied. I am just not satisfied because I feel we could have done more than we have done.

Mr. WEISL. Can we do more now?

General GAVIN. Yes, we can.

Mr. WEISL. What can we do more?

ACCENT ON BALLISTIC MISSILES HAS HURT OTHER PROGRAMS

General GAVIN. Well, we could really accelerate the missile program we now have. They have not been moving as fast as they should move. Because of the need to support the big ballistic missile program such as the Jupiter we have had to cut back on the other things such as a new family of tanks.

Just for example, and I did not mention this point when showing pictures, these tanks have compression-ignition diesel engines providing ranges of around 140 to around 170 miles. Our tank ranges are down around 90 miles, and they have carburetion systems—we must get on with new engines. Of course, this is a very dynamic field. You get a new engine or a new gun or a new tank configuration and by the time it gets into the inventory, just like other things, obsolescence faces us and you should be getting on to something else.

So I think we should put more of our national resources than we have been putting into support of our military programs.

Mr. WEISL. Would you recommend to this committee that they see that we take some steps to see that would be done?

General GAVIN. Anything that could be done to get something done about it would be helpful.

Mr. WEISL. Could you be more specific in what this committee in your judgment ought to recommend?

General GAVIN. Well, sir, I would presume that the committee, upon amassing the great deal of information that will come to it, will come up with recommendations that will accomplish some of these things. It is a very, I would say, deep-seated problem. It involves, first of all, better military and professional military advice going to the Secretary of Defense, in my personal opinion.

Mr. WEISL. Has he got that type of professional and military advice now?

General GAVIN. No; and those words I would choose carefully. He has received good advice but I would not say professional military advice.

Mr. WEISL. General Gavin, could you be a little more specific?

General GAVIN. Well, I will be. Let us put it this way, if I may, and what I say is not in any sense intended to be critical of the existing Department of Defense nor the very able public servants who work in it. In fact, I might say that since I have been over there, people like Dr. Furnas for example, or Murphree, our missiles czar, are some of the most able men I have met in my life.

Mr. WEISL. They are no longer there, though.

General GAVIN. No, sir, they have moved along, but you have a problem, and this is entirely a personal opinion of mine, something like this: Let us take as an analogy General Motors, and take the top management completely out. Ship it all away and scatter it to the winds. Then bring in a vice president from General Foods, and someone from Karo sirup and someone from Endicott shoes, and someone else and put them all together, extremely intelligent men, able men and dedicated men and say to them, "You are going to run General Motors from now on."

Well, Oldsmobile comes in, Buick comes in, Chevrolet comes in and they all make their bid. They want things to be done that way. Things get tight and the money gets tight and things get worse and decisions will be made to hurt these companies, and the top management will have a very difficult time to make decisions. The best thing they can do is form a lot of committees bringing people up out of the corporation and bringing in a lot of outsiders who presumably know a lot about running GM, and these experts then try to solve the problems. But all in all, it is an exceedingly difficult thing.

If this is true in the case of the automotive industry, imagine how difficult it is in something as complex as the military services today. The Air Force problem is exceedingly complicated. Worldwide, it ranges from large bombers and fighter-interceptors to missiles, depots, the schools, bases. The Navy likewise: submarines, carriers, carrier task forces, the fleet in the Mediterranean, the fleet in the Pacific—this whole thing. And the Army with its extensive problems.

For one man and one group of men to run this without getting professional military advice from the people in those services is just about impossible in my opinion.

SECRETARY NEEDS MORE ADVICE THAN CHIEFS GIVE HIM

Mr. WEISL. General Gavin, doesn't the Secretary of Defense have the advice of the Joint Chiefs of Staff?

General GAVIN. Well, yes, he does, of course.

Mr. WEISL. In your opinion as a fighting soldier, and a man that I greatly admire, and everybody on this committee and in the country also, I am sure, is it your considered opinion that this is not the kind of advice or that this is not the ultimate advice that the Secretary ought to have.

General GAVIN. Oh, of course, I would say that is right.

He needs more advice than the Joint Chiefs of Staff give him, I am sure of that.

Mr. WEISL. Well, he has no other advice, has he, in military matters?

General GAVIN. Well, he has a very able group of Assistant Secretaries who can give him advice.

Mr. WEISL. Yes, but they are civilians, they are not military men.

General GAVIN. Some of them may have military background.

Mr. WEISL. What is the average tenure of these Assistant Secretaries?

General GAVIN. Sir, I am not sure but I think statistics have been developed on this somewhat on the order of a year and a half, something of that sort.

I think this is rather close.

Mr. WEISL. Well, do you consider that a turnover of a year and a half in Assistant Secretaries leads to a sufficiently experienced group of advisers for the Secretary?

General GAVIN. No, no, I will get right to the point, Mr. Weisl. This is my personal opinion but many people will agree with me on this.

I think really what is needed now is a competent military staff of senior military people working directly for the Secretary of Defense.

I would have them, and again this is entirely my personal opinion, take over the functions of the Joint Chiefs of Staff.

I would have the military staff so organized to handle operations, plans, intelligence, and in fact break up the Joint Chiefs of Staff.

Mr. WEISL. You heard what the general testified to, Mr. Chairman.

Senator JOHNSON. I heard considerable.

Mr. WEISL. The General testified that in his opinion he would break up the Joint Chiefs of Staff, into units, I suppose they would have command of their respective military forces.

General GAVIN. Well, the Chiefs of Staff, of course, will remain with their own services.

INDEPENDENT MILITARY STAFF RECOMMENDED

Mr. WEISL. And have an independent military staff to advise the Secretary, is that what you are saying?

General GAVIN. That is correct, sir.

Mr. WEISL. Where would this independent military staff come from?

General GAVIN. Well, the members of this staff should be picked from the Armed Forces based upon their background, which should show, as individuals, a good record of schooling, and ability to get

along with other services by having served in the field, in overseas commands and other places where we have joint or unified command. They should be outstanding individuals of senior grade and by senior grade I am talking about 3- and 4-star flag officers or general officers brought up and then put into a staff that is completely integrated across the board.

Mr. WEISL. And would this staff never return to its original service?

General GAVIN. Well, I would say their seniority would be such at this time that it would be somewhat unlikely that they would come back to their service.

Chances are those people would be the ones who would go out ultimately to lead a higher command overseas and the likes of that, but there would be no reason why they could not come back.

This would do a number of things:

First of all, the services would feel that they were getting good representation of their own professional points of view in the top councils in the Department of Defense.

We have staffs organized like this. General Norstad has one in Europe now.

We have staffs in the Far East like this, and so on, and thus this type staff would tend to minimize a great deal of the so-called inter-service controversy you now have in that you get better representation and in any case more satisfaction on the part of the services they would be getting more representation.

Mr. WEISL. In a general way this independent professional staff would be a sort of career staff in that particular capacity.

General GAVIN. Well, I would say that after a certain point in an officer's career it would be so.

That is, as an individual showed ability to move into a staff of this sort perhaps in the senior field officer grade around the grade of colonel then he would be earmarked as a potential top staff officer; a unified top staff man.

Mr. WEISL. Did you read the letter sent by Secretary Lovett to the President, after he resigned as Secretary of Defense in which he recommended a staff similar to the one that you recommend?

General GAVIN. Do you know, Mr. Weisl, you mentioned this about a week ago and I did not get to read it until this afternoon.

I read it this afternoon.

By coincidence I had made up my own mind prior to that reading of it.

Mr. WEISL. I would like with the permission of the chairman and the committee to place that letter in evidence.

Senator JOHNSON. Without objection, it will be incorporated in the record at this point.

(Secretary Lovett's letter is as follows:)

THE SECRETARY OF DEFENSE,
Washington, November 18, 1952

THE PRESIDENT,
The White House.

DEAR MR. PRESIDENT: Some months ago in connection with a discussion of means by which my successor could be provided with a running-start on certain of the administrative and operational policy problems in the Department of Defense, you suggested that I write you an informal letter indicating subjects or general areas where work already begun might be profitably continued by the new administration. You mentioned that what was wanted was a paper which

would express my personal observations and that its form need not be that of a properly coordinated staff study but could be more in the nature of a series of notes which might be expanded in conversation or by reference to Department of Defense files if the subject appeared interesting or helpful.

Accordingly, I am setting out below a series of notes on a variety of subjects in which the Office of the Secretary of Defense has or should have special concern. I will try to make them as brief as possible, but one or two of the points discussed are so controversial that they will need some moderate, factual expansion here.

At the outset it would perhaps be well to state in very broad terms my own general feeling about civilian-military relationships, with a word in passing on the quality of our professional military personnel and their permanent civilian counterparts. This will permit anyone who may read this letter to take into account some of my personal beliefs so that he may adjust for them.

In my opinion, the quality of our professional military officers and the permanent civilian staff is remarkably high. It compares very favorably with any large industrial organization of its approximate size, complexity and wide range of functions. I have great respect and affection for our professional military men and having had an opportunity of seeing them both at the council table and in the field, I know of no country more fortunately situated in this respect than ours.

The permanent civilian staff, consisting mainly of specialists in numerous fields and administrative personnel, has shown faithfulness, reliability and a sense of responsibility of the highest order. In technical, financial and industrial matters I have great regard for their competence and I feel that they provide about the only continuity in the over-all Military Establishment.

Since "unification" is necessarily evolutionary, improvements should be made as experience is gained. Neither the framers of the National Security Act nor any of the Secretaries of Defense can see very far into the future, and while much has been accomplished, much remains to be done in order to provide a more efficient and economical form of national security.

(1) General

(a) The primary purpose of the Department of Defense is, of course, to protect and defend this country. This duty may involve fighting a war. If this becomes necessary, the duty of the Department of Defense is to fight a successful war.

Our objective, however, is to avoid war, if possible. An adequate force ready for immediate defense and prompt retaliation against any aggressor, serves as a deterrent to a potential enemy. The better equipped the Department of Defense is to fight, the better it serves its role of a deterrent to war.

(b) In the event of war, an essential job of the Secretary of Defense and his colleagues, both military and civilian, will involve "distributing shortages" among Army, Navy, and Air Force. Based on past experience, these shortages will involve manpower in bulk and critical occupational specialty; materiel in all its forms; land, water and air transportation; communications facilities; funds; industrial and military facilities and so forth.

(c) Under the present Act, and in the event of war, I believe that the present system of controls provided in the legislation for the exercise of authority by the Secretary of Defense in some areas, will prove to be inadequate. This is so because one of the principal elements of control lies through the budget process, the dollar being the single common-denominator of all requirements. This is, of course, supplemented by control of manpower in bulk although military manpower ceilings for all three Services are currently set by the President and by the Congress.

In the event of war, the dollar control will become especially weak and I believe that better controls must be provided. Some of these will be touched on later in this letter.

(d) The present National Security Act, as amended, requires the Secretary of Defense to make use of inter-service Committees for much of his "staff work" and prohibits him from having a military staff. In time of war, the Secretary of Defense would, therefore, find himself unable to handle the distribution of shortages in an efficient and direct fashion.

It would in these circumstances be necessary, I believe, to undertake a reorganization which would not only seriously disrupt the effective prosecution of the war but which could not even start until the necessary authority was secured from the Congress.

(e) I conclude, therefore, that we should not deliberately maintain a Department of Defense organization which in several parts would require drastic reorganization to fight a war. As I see it, this reorganization can be made in an orderly fashion under the present workload without too much difficulty.

A few of the more important areas requiring attention are mentioned below in paragraphs #2, #3, and #4.

(2) *Secretary of Defense*

The National Security Act of 1947, as amended in 1949, strikes a compromise in many important areas. It has the fault of all compromises and while the amendments materially improve the Act, there are still contradictions and straddles in it.

I believe that the position of the Secretary of Defense, in relationship to the President and the Joint Chiefs of Staff, could, with benefit, be clarified. The Act states that the Secretary of Defense is to be "the principal assistant to the President in all matters relating to the Department of Defense." Under the direction of the President and subject to the provisions of the Act, he has "direction, authority and control over the Department of Defense."

The Joint Chiefs of Staff, according to the Act, are "established within the Department of Defense" and shall be "the principal military advisers to the President, the National Security Council and the Secretary of Defense" and "subject to the authority and direction of the President and the Secretary of Defense," they shall perform certain specified duties.

The question is occasionally raised by legal beavers as to whether or not, in view of vagueness in the language of the Act, the Joint Chiefs of Staff are directly under the Secretary of Defense. In my experience with the Joint Chiefs of Staff this problem has not arisen, not only because of the attitude taken by the President but also that of the Joint Chiefs themselves.

While, in my opinion, the authority granted the Secretary of Defense is superior to any made to the Joint Chiefs of Staff, since he is "the principal assistant to the President in all matters relating to the Department of Defense," whereas the Joint Chiefs of Staff constitute an element "within the Department of Defense." It may be well to remove by legislative amendment this area of possible debate. If further clarification of the Act by legislation is not considered desirable, I am of the opinion that the President can clarify the matter by a simple directive.

Another problem which will be referred to in more detail under the notes dealing with the Munitions Board, arises out of possible confusion in the Act which provides that the three Military Departments shall be "separately administered," while at the same time providing that the Secretary of Defense shall be head of the Department of Defense which shall have within it the three Military Departments over which the Secretary of Defense shall have "direction, authority and control." No great difficulties have been encountered because of this straddle, except in the field of supply warehousing and issue, where certain ardent separatists occasionally pop up with the suggestion that the Secretary of Defense play in his own back yard and not trespass on their separately administered preserves. I feel that the Secretary of Defense clearly has authority to step in where necessary in these fields, provided he does not transfer, reassign, abolish or consolidate any of the "combatant functions assigned to the Military Services by the Act.

(g) However, to avoid a waste of time in arguments, it would be well, I think, to have this clarified definitively and I believe that it could be simply done by following the procedure already favorably acted upon in the case of other executive agencies through adoption of the recommendation of the "Committee on Organization" looking toward correcting the present diffusion of authority and diffusion of responsibility in certain executive departments. Under reorganization plans previously submitted to the Congress by the President, all functions of all other offices of a department and all functions of all agencies and employees of a department are transferred to the Secretary of the Department with exceptions, if necessary. The application of this approved procedure to the three Military Departments or the Department of Defense could neatly cure such questions and I believe it should be considered.

(3) *Joint Chiefs of Staff*

The statutory responsibilities of the Joint Chiefs of Staff indicate, in my opinion, one of the principal weaknesses of the present legislation. These weaknesses are common to the three Statutory Agencies placed in the Department of Defense, namely, the Joint Chiefs of Staff, the Munitions Board and the Research and Development Board. In consequence, some of the general observations regarding the problems of the Joint Chiefs of Staff are equally applicable to the Munitions Board and the Research and Development Board and some comments regarding the latter two are valid with respect to the Joint Chiefs of Staff.

In brief, the weaknesses stem from (1) excessively rigid statutory prescriptions of functions, (2) rigid statutory composition which makes the agency, in effect, an Interdepartmental Committee, and (3) the requirements in the statute that each agency perform functions inappropriate, if not actually impossible, for an Interdepartmental Committee to perform efficiently and expeditiously.

One of the most important issues which was compromised in the National Security Act, as amended in 1949, is the position of the Joint Chiefs of Staff. I do not consider the present organization adequate, not only because it leaves certain responsibilities obscure but also because in its present form it does not provide the type of military guidance needed if the full benefits of unification are to be attained.

The problem of the proper set-up of the Joint Chiefs of Staff is the most difficult and delicate one in the field of our national defense structure since it involves the striking of a proper balance between civilian and military control. It is clear that overall "civilian control" is essential and that it is fundamental to our form of government. Yet civilian judgment must be based on adequate military advice given by professional military men in an atmosphere as free as possible from service rivalries and service maneuvering.

The President, the National Security Council, the Secretary of Defense and the three Service Secretaries clearly must have proper military advice. On the other hand, they should not, in my opinion, attempt to conduct military operations and they should avoid hampering the military in carrying out their specialized functions assigned to them by law. The most effective work which the civilian Secretaries can do lies, as I see it, in the establishment of policies under the guidance of the President, as Commander-in-Chief, and in the exercise of direction, authority and control of the Military Departments themselves.

(a) By their very makeup it is extremely difficult for the Joint Chiefs of Staff to maintain a broad non-service point of view. Since they wear two hats—one as Chief of an Armed Service and the other as a member of the Joint Chiefs, it is difficult for them to detach themselves from the hopes and ambitions of their own Service without having their own staff feel that they are being let down by their Chief. The maintenance of an impartial, non-partisan position becomes increasingly difficult in times of shortage of either men, money or material. In fact, it is remarkable that the form of organization currently in being has worked so well and it is, I think, a tribute to the quality of the individual involved.

It is extremely difficult for a group composed of the Chiefs of the three Military Departments and charged, with the exception of the Chairman, with heavy responsibilities placed upon them by law with respect to each individual Service (Army Public Law 518, 81st Congress; Navy Public Law 432, 80th Congress; Air Force Public Law 150, 82d Congress) to decide matters involving the splitting of manpower, supplies, equipment, facilities, dollars, and similar matters.

(b) In over-simplified form, one of the major difficulties with the present Joint Chiefs of Staff organization is that they are grievously over-worked as a result of the great volume of papers referred to them for their views. In consequence, they are too deeply immersed in day-to-day operations, frequently of an administrative character, to have adequate time to devote to their major responsibilities—the preparation of overall, joint and combined strategic plans, the development of logistic plans, the review of such plans in the light of the material and personnel situation and the effect of new weapons.

The problem mentioned in (b) above is aggravated by the fact that the Secretary of Defense has no military staff. In consequence, he must refer to the Joint Chiefs of Staff a vast amount of administrative and policy matters, unrelated to their main functions, since he has nowhere else to turn for the development of military facts or to draw on experienced military judgment.

Strangely enough, the fact that the Secretary of Defense is prohibited from having a staff is not generally realized. The prohibition, however, occurs in Section 203 (a) which states specifically that officers of the Armed Services may be detailed to duty as assistants and personal aides to the Secretary of Defense, "but he shall not establish a military staff other than that provided for by Section 211 (a) of this Act." The section referred to is the one which establishes the Joint Chiefs of Staff. In consequence, the Secretary of Defense has no alternative but to flood the Joint Chiefs of Staff with all sorts of papers originating in the three Military Departments, the statutory agencies and the other executive agencies of government and the Congressional Committees.

The reason for this provision is fairly clear in the legislative history and is a derivative of the line of thinking which developed the compromises through fear of the establishment of an "Armed Forces General Staff" which was specifically

prohibited by Section 2 of the Act. As a result of compromise and unnecessary apprehension, we have succeeded in making the Joint Chiefs of Staff a sort of clearing house for papers instead of having them occupy their rightful position and instead of leaving them adequate time for their great responsibilities.

On the point mentioned in (a) above, the fear of an "Armed Forces General Staff" again seems to have dominated our thinking. The broad national service point of view, as compared with the single service point of view, is not merely a problem of the individuals making up the Joint Chiefs of Staff, but is more likely in the Joint Staff which prepares the papers and submits the analyses and studies to the Joint Chiefs of Staff. This staff, by law, consists of officers of approximately equal numbers from each of the three Armed Services. They are of relatively junior grades and their future careers and promotions lie in their separate services. It is not unnatural, therefore, that they should from time to time become the advocate of their own Service's point of view. There is, furthermore, a natural temptation to indulge in the indoor sport of "back-scratching." The Joint Chiefs of Staff have taken great precautions to prevent such occurrences, but until calculating machines replace humans in staff functions, the danger will, I believe, exist.

For the above reasons, among others, I feel that we should profit from the experiences we have had in the last two years under conditions of partial mobilization and warfare. A great deal of thought has been put on the problem and its solution. I am not sure that we have the right answer yet. On the other hand, I believe we can make an improvement in the setup and, perhaps the new President and new Congress should consider some of the suggestions which could be made.

Based on experience so far, I believe that the problem might be solved by a reorganization along the lines of Alternate (I). A more radical, long-term possibility is indicated in Alternate (II), below:

(I) (a) Re-define and clarify the functions of the Joint Chiefs of Staff so as to confine them exclusively to planning functions and the review of war plans in the light of new weapons and techniques, transferring the balance of the present military-staff functions of the Joint Chiefs under (d) below.

(b) The Joint Chiefs of Staff should create a strong planning division which would constitute their principal staff.

(c) It should be clearly understood, by legislative amendment if necessary that, in order to relieve them of certain of their individual operating responsibilities in their several military services, each Chief of Staff has very broad powers of delegation to his Vice Chief.

(d) The balance of the military staff functions should be transferred to the Office of the Secretary of Defense to provide him with a combined military-civilian staff. This staff would be responsible only to the Secretary of Defense, and through him to the President, and the efficiency ratings and promotions should be controlled by him. Adoption of a procedure similar to the method which the Army has long used to protect General Staff Corps officers would seem adequate. This would appear to involve an amendment to the Officer Personnel Act as presently in force. This staff would aid the Secretary of Defense in acting upon such matters as resolving conflicts between Services and aid him in matters involving policies regarding budgets, procurement, logistics, manpower, personnel, intelligence, etc.

(e) The Joint Chiefs of Staff should not "operate" or "command," except in time of war and then "by direction." Unified commands should be established by the Secretary of Defense, with the advice of the Service Secretaries and the Joint Chiefs of Staff, and should be assigned to a military Department as the Secretary of Defense's agent, if necessary, and not to a member of the Joint Chiefs of Staff in his other capacity as the Chief of a Service. Flexibility is required in this field in order to deal with different situations as they may exist. The Act currently makes possible the violation of the principle of civilian control by leaving it confused as to whether, in the case of unified commands, the theater commander reports to the Joint Chiefs of Staff or the Secretary of Defense. In my opinion, the Secretary of Defense, as the "principal assistant to the President in all matters relating to the Department of Defense" should, in effect, be the Deputy of the Commander-in-Chief and, therefore, any unified command should be established by him, report as directed by him and, similarly, receive orders by his direction.

Since any unified command has functions broader than a single Military Department, it would be well to review, as part of the study of the Joint Chiefs of Staff, the present directives of unified commands to disclose their strengths and weaknesses and to find ways to improve them, if necessary.

The above very condensed outline may serve to indicate certain steps which, by a mixture of legislation and administrative action, would, I think, substantially improve the present efficiency of the Military Establishment. They represent only indications of methods, and the exploration of them should, in my opinion, be continued energetically in the hopes of arriving at a sound conclusion.

(f) The Chairman of the Joint Chiefs of Staff should be given a "vote." While the "voting" procedure is not normally used, the Act denies the Chairman a "vote." It is perfectly obvious that he will have, or should have, some opinion on the matters which come before the J. C. S. for discussion and it is unrealistic to assume that the Secretary of Defense will not ask his opinion or that he will not give it. The Chairman of the Joint Chiefs of Staff is the only member who is not directing a particular Service. He is the military officer to whom the President and the Secretary of Defense must look for the organization and evaluation of military judgment. He should not, however, be given the power of decision, which must remain in the President and the Secretary of Defense if civilian control is to be maintained. But the Chairman must be a participant in the discussions, looking toward unanimity of opinion on a course of action, or failing to get unanimity, he must identify the differences of opinion and submit the various points of view, together with his own, to the Secretary of Defense for decision.

(II) An alternative approach which might provide a solution would require a series of evolutionary steps and the adoption of a system, all the implications of which I have not adequately thought out. It would involve a change in the make-up of the Joint Chiefs of Staff by having its membership consist of senior officers who have served as Chief of Staff of one of the three Services and who immediately upon completion of such duty becomes a member of a Combined Staff. The divisions of this staff would consist of functional staffs of professional military officers in the field of strategic planning, logistic planning, military requirements and overall military policies. This group of officers would have a separate promotion system and would be accountable only to the Combined Staff, the Secretary of Defense and the President. There would be no single Chief of Staff and the Chairmanship might rotate. It must be recognized, however, that the concept of this staff appears to run contrary to the prohibition contained in the National Security Act of 1947 against an "Armed Forces General Staff." Under this form of organization, the Secretary of Defense would continue to need a staff of his own for the purposes indicated in (d) above.

The establishment of any unified staff along the above lines would require the development of a system to provide properly trained personnel. This process would take several years to develop and perfect, since it would seem to require additional specializations in certain scientific, technical, and industrial fields.

It is my present opinion that this alternative approach, even if it should be found to be promising, involves too abrupt a change from the present system and that it might be disruptive. It would, in any event, require several years of preparation and careful study. I conclude, therefore, that the more moderate reorganization in Alternate (I) is preferable at this time.

(4) Munitions Board

This Statutory Board, with built-in rigidity under the existing Act, will not in my opinion, be able to perform adequately in time of war the various functions presently assigned to it by statute. There are three principal inadequacies in its organization.

First, the membership of the Board, prescribed by law compels three of the four members to sit as judges on their own requests and to pass on estimates of production, on schedules and on procurement and distributing systems for which they are each responsible in a separately administered service. They are thus in the position auditing themselves, consolidating themselves, and passing their own plans. Even with the exercise by the Chairman of the power of decision delegated to him by the Secretary of Defense, the difficulty is not solved.

I believe that real flexibility in the makeup of the Board is needed and the selection of the Board should be left to the Secretary of Defense in order to permit the inclusion of a number of men of broad industrial, engineering, scientific and general business background, as required.

Secondly, the military advisers of the Board and the military members of the Board's combined military and civilian staff can be subjected to pressure by their branch of the Service because of the control of fitness reports and promotions by their services. While every effort is made to protect the officer in the exercise of his independent, professional judgment, many competent officers try to avoid this type of duty lest they be put in the position of serving merely as a watchman

over the interests of their Service. This problem and its cure is about the same as in the Joint Staff.

Thirdly, the duties assigned to the Munitions Board by the Act are confused by the apparent emphasis on the planning aspects of procurement, production and distribution problems associated with industrial mobilization, thereby permitting technical challenges of the validity of its decisions by doctrinaire proponents of "separate administration." This problem was briefly discussed in connection with the powers of the Secretary in paragraph (2) above.

The suggestion has been made that in the interest of clear lines of authority and responsibility, the Munitions Board be abolished and that its functions be transferred to the Secretary of Defense by an amendment to the existing statute which would, in addition, direct the Secretary to Establish a Munitions Advisory Board. While the present powers of the Secretary of Defense are adequate, in my opinion, to appoint an Advisory Board without specific authorization, it might be well to mention this area of activities in any amended legislation. Under this approach to the problem, the Chairman of the Munitions Board should be replaced by an additional Assistant Secretary of Defense.

The cure for the problems presented by the rigidity of organization and over-specification of functions of the Munitions Board and the Research and Development Board, which suffers from similar ills, does not appear to be difficult. It does, however, require legislative action to permit the administrative reorganization.

(5) *Organization of the Armed Services*

The organizations of the Army, Navy and Air Force are all different. The responsibilities and authorities of the Chiefs of Staff of the three Services differ. Their present organization follows a pre-unification pattern and some parts are fixed by law while others are not.

It would be well, I think, to have a thorough-going functional and organizational study of the three Military Departments, now that they are part of the Department of Defense, to determine the good and bad points in the organization and to take common advantage of the best features of each Service.

As an indication of one area in which modernization and improvement appears to be needed, consider the "technical services" organization in the Army. There are seven technical services in the Army—Corps of Engineers, Signal Corps, Quartermaster Corps, Medical Corps, Chemical Corps, Transportation Corps, and Ordnance Corps. Of these seven technical services, all are in one degree or another in the business of design, procurement, production, supply, distribution, warehousing and issue. Their functions overlap in a number of items, thus adding substantial complications to the difficult problem of administration and control.

It has always amazed me that the system worked at all and the fact that it works rather well is a tribute to the inborn capacity of team-work in the average American.

One result of this type of organization is to form a "service" on the basis of a profession rather than on the basis of its functions. In other words, let us say that civil engineers are in the Corps of Engineers; electrical and communication engineers in the Signal Corps; mechanical, industrial, hydraulic, ballastic engineers are in Ordnance, etc.

A reorganization of the technical services would be no more painful than backing into a buzz saw, but I believe that it is long overdue. I have a memorandum outlining one method of reorganization which looks promising. The study is recent and was completed in September 1952.

(6) *Headquarters Structure*

The problem of the number of Headquarters in the field as well as in the zone of the interior is steadily growing. It is aggravated by the requirements imposed by the activities of the North Atlantic Treaty Organization, but it existed prior to the formation of that body. There are, in my opinion, far too many levels of headquarters in the Military Services thus adding to the overhead and inevitably causing delay. Furthermore, each headquarters sets up a chain reaction of demands for housing, transportation, etc., thus adding to the cost. Special groups have been investigating this area for some time in connection with the utilization of manpower and I think the effort to reduce the number of headquarters must be given every assistance by the senior Defense officials.

I have a similar feeling about the number of Committees. This matter is not so much in the control of the Military Departments as Headquarters are, but the formation of Committees is a very contagious virus which has the unpleasant characteristic of rapid reproduction.

(7) Personnel

Intensive study has been given to the problem of personnel over the past two years, with particular emphasis on the reduction of non-combat personnel wherever it can be done without impairing the combat efficiency of the troops. Our basic doctrine which emphasizes fire power and the self-sufficiency of our divisions so that they may continue in efficient combat over long periods of time, obviously requires very substantial supporting troops, not only in the rotation of men but in a constant and reliable system of supply. While considerable progress has been made, there is still much room for improvement, and the Manpower and Personnel Section of the Office of the Secretary of Defense is cooperating fully with the independent Citizens Advisory Commission on Manpower Utilization in the Armed Services, appointed upon the recommendation of Congress. A distinguished group of civilians on this Commission will devote its attention to the very important area indicated by their title and improved methods and savings are reasonably to be anticipated.

However, even if theoretical perfection were obtained in the fields of personnel use mentioned above, we would still be left with the problem of reducing the annual fixed costs of the Military Establishment to be maintained over a period of years. One of the most promising areas of reduction of cost lies, in my opinion, in keeping the standing military forces to a minimum to protect against disaster while having immediately available a basically trained Reserve. The only satisfactory method of accomplishing this desired result, that I am aware of, is through a system of Universal Military Training and Service. I believe that steps should be taken promptly to make this system effective.

(8) Legislation on Official Secrets

One of the great hazards to national security lies in the apparent inadequacy of existing legislation to protect this country against traitors, spies and blabbermouths. The problem is not one peculiar to the Department of Defense and perhaps matters of this general sort might lie more appropriately in other agencies of Government. However, this problem is not a new one, and it was, in fact, raised by Secretary Forrestal. I mention it again as I feel that it is a subject of cardinal importance and should receive prompt action.

(9) Non-defense Activities

There is one final, overall impression which I have and which I feel is worth mentioning. There is a natural tendency during periods of military production and mobilization activity to hang all kinds of appendages on the Department of Defense. Sometimes this is done because the Military Establishments are 24-hour-a-day operations and have trained and capable personnel; but sometimes the attachments are made to bring the functions under the umbrella of "military necessity." Whatever the reason may be, I feel that the Department of Defense is so large, its responsibilities are so great and its operations so world-wide that additional functions should be placed in this Department only as a last resort.

* * * * *

All of the above subjects are matters which I have discussed with you from time to time during the past year and represent, with particular deference to the Office of the Secretary of Defense, the Joint Chiefs of Staff and the Munitions Board, organizational problems which you requested me to study and report to you on by 1 December. There is ample room for difference of opinion between reasonable men on my comments on these difficult subjects, especially since they represent views based largely on personal experience. I offer them, therefore, without any missionary zeal and only in the hopes that they may save the time of my successor. Another person, with different work habits, might find other problems or apply different emphasis to these. I believe, however, that progress will be made in some of these areas only by trial and error and that we can improve vast organizations such as the Department of Defense only by constant review.

There are, of course, countless other matters which my successor should be informed of and to which he should give early consideration. Most of them, however, involve matters of military security and should, therefore, be dealt with under the usual classified material procedures. I will do my utmost to see that my successor is fully briefed on all such matters and I will gladly hold myself at his disposal for any assistance I can give in making his takeover of responsibilities smooth and effective.

With great respect, I am,
Faithfully yours,

ROBERT A. LOVETT

Mr. WEISL. Would you like to comment on Secretary Lovett's recommendation in that regard, as it relates to the recommendation that you are now making?

General GAVIN. Well, now, sir, again I did not read that letter until this afternoon and from my first reading of it I thought it was a very good and a very fine letter.

It made some good points.

HIGH COMPLIMENT TO NEW SECRETARY OF DEFENSE

Mr. WEISL. Have you any other suggestion to make to this committee, General Gavin, with respect to the efficiency of the Department of Defense so they can build missiles, satellites and so forth more quickly and have a more forward-looking program for future weapons?

General GAVIN. Well, it seems as clear to me as anything I can think of that we must get better military advice to our Secretary. I think that we have today in the Secretary of Defense the most able man who has come to that office; in my personal opinion, an extremely able man.

As in an industry or anything else, the right people are necessary. No organizational structure can make something if you don't have good people in it.

Senator JOHNSON. How long have you known the present Secretary of Defense?

General GAVIN. About 4 months and during that time I spent a week with him, before he came to office, visiting a number of facilities in the Department of Defense.

I had a number of opportunities to talk about his problems at that time.

Senator JOHNSON. That is a very high compliment you pay him.

General GAVIN. I meant every bit of it, sir.

Mr. WEISL. Are there any other suggestions, General Gavin, that you would make or would like to make to the committee in this connection?

General GAVIN. Of course, the organizational structure that would have to have good people in the right places and have adequate funding; adequate funding in basic research as well.

Both are important.

Mr. WEISL. Have you any suggestion as to the elimination of committees?

General GAVIN. This would eliminate many of the committees that now exist.

Mr. WEISL. How does the present Secretary get advise on military or procurement matters today?

General GAVIN. Well, sir, I have—

Mr. WEISL. I don't mean as an individual, but what access has he to the advice?

General GAVIN. Having spoken so highly of him, I am sure that he can present his own point of view in a very effective way indeed.

Mr. WEISL. I am not talking about his personal point of view but under the system that exists.

General GAVIN. Well, he has a Deputy Secretary, and a number of Assistant Secretaries and they in turn have staffs working for them and then there are quite a few Department of Defense committees.

From all of that advice comes to him, to the top of the pyramid.

WOULD RESULT IN SIMPLIFICATION OF PENTAGON STRUCTURE

Mr. WEISL. Do you believe that if this career staff or professional staff, or whatever you call it, were instituted to give independent advice to the Secretary a great deal of these committees and the complex structure of the Defense Department could be eliminated?

General GAVIN. Yes; I do.

Mr. WEISL. You think the work could get on quicker?

General GAVIN. I do, sir.

Mr. WEISL. Have you any suggestions, General Gavin, as to how we can speed up research so that as weapons become obsolete we are ready or as ready as one can be, with new weapons.

General GAVIN. Well, of course funding is very important.

One of the problems that we have been through in the last 3 years is that of being unable, despite the soundness of the proposal, to persuade the Department of Defense that the proposal had, in fact, merit.

The Armed Forces are always accused, or frequently are, of preparing for the last war rather than the next.

I have found to my great disappointment when I have arrived in the position in which I am supposed to do some of this preparing, that it is exceedingly difficult to prepare for the next war because it is difficult to get a new idea across.

With the type of professional staff which I have recommended, you would get more understanding, more acceptance and as a result better advice going to the Secretary of Defense.

Mr. WEISL. I don't know, General Gavin, whether you were present when I read the letters from scientists, technologists, and manufacturers of weapons in which they lodged certain complaints as to the slowness and the lack of long-term planning, et cetera.

General GAVIN. No, sir, I was not present, I did not hear that.

Mr. WEISL. You were not.

Now, you are familiar with the decision made by the Department of Defense to put into production both the Jupiter and the Thor missiles?

Again without violating security, do you think it is proper to tell the committee the Army's view on mobility in connection with such missiles?

General GAVIN. Well, sir, I noted what General Taylor said about mobility and of course I agree with him entirely.

We think in terms of mobility.

Mobility is one of the functions of survival in combat.

Whether you are an individual, or 10,000, if you don't move you don't live long, and whether it is some missile unit or anything else it has got to move; mobility is one of the essentials.

You could build an armadillo with a great defensive capability but, if it could not move, it would not be worth much.

We must have mobility in these systems, absolutely.

A FIRST GENERATION MISSILE—MOBILITY WILL COME WITH TIME

Mr. WEISL. General, you have had to fight, you are a fighting soldier and you know what is needed.

Do you believe that these intermediate missiles I have mentioned are mobile?

General GAVIN. Well, certainly the Jupiter is in this concept.

I would say this about it: It is a first-generation missile. I would say to you, gentlemen, that for this range, this is probably the least mobile missile you will ever see because they will become smaller in size, more efficient in handling, have better handling gear, and be more mobile as we go along, but the Jupiter is a mobile system.

Mr. WEISL. You believe that a system could be worked out that could effectively move these—this instrument, this missile?

General GAVIN. Yes, this is being developed this way.

We have never thought of it in any other way.

Mr. WEISL. You are developing the system as far as the Jupiter is concerned?

General GAVIN. That is right, sir.

Mr. WEISL. And you believe that it is very vital and necessary to have mobility?

General GAVIN. Oh, absolutely.

Mr. WEISL. I wish, again not knowing the limits of security as well as you do, if you could within security restrictions explain to the committee why you are so convinced of the need for mobility.

“PEOPLE WHO HOLE UP IN CONCRETE FACILITIES DON'T LIVE LONG”

General GAVIN. Well, I would not want to impose upon the committee and go into a lengthy explanation.

I suppose for someone in the Army it stems from your own experience, and from the beginning of when you learned about these things.

Let us put it this way:

In combat one soon learns that people who hole up in big concrete facilities don't live long.

In Sicily, for example, I recall concrete pillboxes three stories high with floors in them and trapdoors that were pulled up so even that when you overcome the ground floor you still did not have them—you had to work your way up.

Yet fighting them, fighting the people there, once they got into those pillboxes you knew your problem was over then.

You really had them then; it was just a question of time.

You could even go back over to the hedgerow, eat a can of rations, and decide to come back and polish them off when you were ready.

I had a parachute regiment that went into that affair and those people who holed up against us in fixed facilities did not last long. The people who were outmaneuvering us were the ones we worried about.

Toward the latter part of the war, in the fall of 1944, I had a parachute division that went into Holland. We were confronted with some 120 ack-ack emplacements, and there was a great deal of speculation about how they would do, about how they would do with parachutists coming down on top of them and none were very promising predictions.

The choice is very simple. The man being attacked has one choice—to fight there. The one in the position of mobility has the opportunity to think over choices of action. He can probably fight another day. Well, the people in fixed positions did not live long. They were cleaned out.

This has been a fixed pattern of experience.

Once you pin yourself down to a hole in the ground and pull the hole in on top of you, your days are through, you have got to move, you have got to move to survive and we think this is true of ballistic missiles as well as anything else, and the loads are no bigger than we have in the mobile army today.

We have mobile hospitals. We recovered 50-ton tanks with retrievers under fire. Moving ballistic missiles is no problem.

GERMANS' FIXED FACILITIES DESTROYED

Mr. WEISL. In your experience in Germany also in the last war you found that the V-2 weapons of the Germans were all destroyed by the American Air Force when they were on immovable platforms; isn't that right?

General GAVIN. Well, sir, this is the story as I understand it, and I think you have got the man available who knows, Dr. Von Braun. He had to fight that problem.

But as I understand it, talking to him, the reaction of the scientists was to build nice concrete facilities with cafeterias and workshops and bunkhouses and the like of that about, near the launching site.

Whereas the professional military people wanted a mobile system and they decided to compromise and they did not do much shooting off the fixed facilities. These were destroyed.

The mobile systems were completely effective.

Mr. WEISL. General, before we leave and go into the satellite field with which I know you are quite familiar and to which you have given a great deal of thought, have you anything further that you want to say on the questions that were propounded to now?

General GAVIN. No, sir.

Mr. WEISL. Have we covered the ground sufficiently?

General GAVIN. I believe so. I would like to add as a cleanup that the Army believes now, and it always has believed, that all services have requirements for missiles. If there is any way that we can help another service get a better missile, we want to do it and we are trying to do it. This has been our policy right along and we have insisted on this.

Mr. WEISL. You are doing it with the Jupiter, and I understand you are also training men to man the Jupiter?

General GAVIN. Well, that is correct, sir.

We spent, well I have spent about a million dollars and 4 months' delay in helping get the Navy a seagoing Jupiter for awhile, until they later dropped and went to Polaris.

When the proposal was made to do a 1,500-mile missile, as a matter of fact for the Air Force, we offered to, and these are the words, "enthusiastically develop it for them."

We feel strongly about this missile business. We think we need missiles and need them badly, and, as the services have requirements for them, we want to help them get them.

Mr. WEISL. Now you have made a study of the military significance of satellites, have you not?

General GAVIN. Well, in the ordinary course of my work this is normal; yes, sir.

Mr. WEISL. Do you think that from the standpoint of security we ought to discuss your study in open session or not?

General GAVIN. Well, I would say to a limited extent; yes.

Mr. WEISL. Do you believe that the satellite has great military significance?

General GAVIN. Tremendous significance; perhaps the most significant thing of our times.

GIVES SATELLITE HIGHEST PRIORITY

Mr. WEISL. Do you believe the satellite ought to be worked on as effectively and with as high a priority as ballistic missiles?

General GAVIN. I give the satellite higher priority.

Mr. WEISL. Even higher?

General GAVIN. I would.

Mr. WEISL. Please tell us within the limits of security what the military significance and necessities dictate in the satellite field.

General GAVIN. Yes, sir.

May I say why I said "higher."

In the first place, no satellite is any better than the main thrust unit under it.

You cannot get a satellite up without a good engine.

We tend to be reactive in our program.

We tend to look over our shoulder on what someone else is doing and do that sort of thing.

We are on the point now where we had better get out on the curve of progress, very, very far out, and this means getting out to satellites as fast as we can and then bring along with it the propulsion units to get the satellite up.

So I would presume that this would be understood.

Mr. WEISL. You don't believe we ought to wait until we have a stockpile of ballistic missiles before we go to the satellite field; do you?

General GAVIN. We should move along with the satellites on the highest priority and then the ballistic missiles as fast as we can bring them along.

Mr. WEISL. And in order to launch a ballistic missile, as you point out, you must have a rocket engine with a heavy thrust?

General GAVIN. That is absolutely true.

WHAT THE SATELLITE WILL BE USED FOR

Mr. WEISL. Tell us briefly within the limits that you feel necessary, what the military and other significance of a satellite is?

General GAVIN. Well, sir, there are some obvious things.

First of all, you have a vehicle that is flying over land on a predicted orbit, as a regular thing.

It is quite simple to see that this could be a reconnaissance vehicle.

A reconnaissance of the conditions of, let us say, weather; I believe Dr. Teller talked about this.

It can see large weather patterns developing.

It could give you a system of predicting weather changes well in advance of anything now in existence.

It could also do what we refer to as mapping and geodesy, the relationship of the large land masses to each other on the surface of the earth.

A great deal is not known about the interrelationship of land masses, so it could contribute directly to a better understanding of what the earth really is and the dimensions of the earth.

If it could do these things, it could achieve a more sophisticated form of reconnaissance, and it does not take too much imagination to see this, I am sure.

If this is the case, this brings us to the next thing: I would think that it would be in the national interest of this country to have a capability to say that there will or will not be a satellite reconnaissance of the area that concerns us, the Western World or the United States. This suggests at once that you should have a capability of denying satellite overflight, so I am again dealing in a speculative way with a military significance of the satellite.

TRIP TO THE MOON

Mr. WEISL. Dr. Teller testified, I believe, that it was very important for us to reach the moon.

Now, as a practical man, and as a fighting soldier, do you believe that it is vital for the United States to be able to reach the moon?

General GAVIN. Oh, absolutely, absolutely.

Mr. WEISL. Can you tell us why?

General GAVIN. Well, yes.

In the first place, I might say, of course, you know when you deal with problems such as this, it is like Queen Isabella asking Columbus what he was going to find where he was going, when she was trying to pawn the crown jewels, and it was fantastic as to what this country was going to be, and it could not possibly be foreseen.

In the first place, if you are going to the moon you have got to develop a unit that can leave the earth, and this requires a very high propulsion; it requires the solution of many complex, difficult, challenging, scientific problems that all in themselves will contribute a great deal to understanding about the environment of man on the earth.

He will have to travel through the ionosphere and communicate once he is through.

This poses, at once, very complex communication problems.

Next, you will find out about the impact of meteorites and meteoric dust on the object.

You will then begin to find ways of living out there.

There are various ways of getting to the moon. One is to go directly to the moon, and another is to establish a station in space, and then use it as a steppingstone to go to the moon.

So that if you were to establish a planetary vessel in space, a space vehicle, space station, let us say, the establishment and the maintenance of that would provide us with a tremendous amount of information to the betterment of humanity, unquestionably.

Now, then, to go to the moon itself, there are a number of reasons why you should want to go there.

First of all, you have accomplished a great deal in getting just this far, and next it is there, and you want to go there because it is there; you want to see what is there. There is considerable speculation about the body of the moon itself, how dense it is, what the surface of it is, and what it is composed of.

This we would want to find out. We have never seen the far side of the moon, and we are quite curious about what is on the far side, so we would like to get on out and see what it is made of and what conditions are prevalent on the surface of the moon.

Next, we are faced with this problem: If I, as a soldier, were asked by my superiors in this country, is the moon of any significance to us, if the Soviets, for example, are occupying it, I would say absolutely, yes. We have got to get out there. We have got to get out there first, and if they are out there, we have got to have some understanding of who is going to occupy the moon.

You have a problem here of very impressive proportions, in my opinion. You have got to get out there, and get out there first and be able to sit down in international councils and determine as to who is going to be out there and who is to do what out there.

So you have a number of problems, not only the basic international problems, but basic political problems.

Senator JOHNSON. Have you made any plans to go along with Dr. Teller? Are you going to travel together?

General GAVIN. I would gladly join Dr. Teller in any venture.

Well, sir, this, very quickly, has been a rather speculative——

Senator JOHNSON. You make it sound very exciting.

Mr. WEISL. The general is quite serious about this, Mr. Chairman.

Senator JOHNSON. Who isn't serious about it?

Mr. WEISL. Now, the mapping of the earth's surface is important, is it not, in connection with the use of ICBM's?

General GAVIN. Oh, absolutely, I think so. I think this is not well understood.

But, you see, the ICBM suggests to many people that the manned aircraft is no longer effective in that range category.

If this is true, then a manned reconnaissance airplane is likewise no longer effective, and, if this is true, an unmanned reconnaissance vehicle is necessary to match to an ICBM, and this is a satellite.

Senator JOHNSON. You may proceed, counsel.

Mr. WEISL. In your opinion, General Gavin, what are the bottle-necks which impede the missile and satellite program?

LACK OF FUNDS HAS IMPEDED RESEARCH

General GAVIN. Well, sir, I would say that there have been, once the programs have been gotten underway, there have been none in the IRBM programs; and I presume there are none in the ICBM, although I would leave it to the Air Force to talk about that.

In the others; lack of funds.

Mr. WEISL. Sir?

General GAVIN. Lack of funds in the other programs.

Mr. WEISL. Lack of funds?

General GAVIN. Yes.

Mr. WEISL. How about research?

General GAVIN. Yes, sir; in research and in development.

Mr. WEISL. There has been lack of funds in that?

General GAVIN. That is right; yes, sir. They have been funded, but not up to the optimum, and there has been slippage from year to year in some of them, most of them.

Mr. WEISL. Have you any recommendations, General Gavin, to make to the committee for accelerating the program?

General GAVIN. Well, I believe that if the organizational recommendations were adopted that I mentioned earlier, and adequate funds were provided, the programs would move along all right.

Mr. WEISL. Is there anything further that you would like to say, General, that I have not covered?

General GAVIN. No, sir. I am available to you—

Mr. WEISL. Thank you very much, General Gavin.

Mr. Chairman, that is all the questioning I want to do at this time.

Senator JOHNSON. Thank you very much.

General Gavin, I think I should say to you that it has been quite a treat to hear you. You talk like the kind of fellow that I have been looking for ever since we started these hearings, and that is a fellow who thinks that things can be done perhaps a little bit faster and perhaps a little bit better.

I want to explore further with you any possible suggestions you might make to us.

I am convinced that none of the men in the higher echelons in any of our services are unpatriotic; I am convinced they are all dedicated men who want to serve their country as they believe their country should be served. But I am not convinced that they are what I call "can-do" fellows.

I have, in my limited experience, many times encountered individuals who can always find a dozen reasons why something that ought to be done cannot be done today, and I am frightened by, not just the pictures that you have presented, but by the sum total of all the pictures that have come to me, and my information is necessarily quite limited.

Now, General, during your presentation on the Soviet Army weapons, as I recall it, you stated that this is the last of the pictures that "I have been allowed to bring here." Is that correct?

General GAVIN. I do not recall the word "allowed."

Senator JOHNSON. I understood that you said that, and it had more than passing significance.

General GAVIN. Perhaps I used it in the sense that the committee permitted me to bring them. There was no restraint on me.

NO RESTRICTIONS ON HIS TESTIMONY

Senator JOHNSON. I am very glad to hear that.

My next question—we are going to follow through on the picture—have you been restricted in your testimony in any manner, in any form, by anyone?

General GAVIN. Absolutely not; no, sir.

Senator JOHNSON. I am glad to hear that, General.

Now, have you fully considered every possible recommendation that you care to make for putting the missile program back on the track and expediting it, accelerating it? Have you said all to this committee that you think you could say that would accelerate it?

General GAVIN. I believe so, sir.

Senator JOHNSON. Do you believe that Sputnik No. I and Sputnik No. II have capabilities of mapping the earth? You were talking about reconnaissance and the mapping of the earth, and I just wondered what capabilities you felt that Sputnik I and II might have?

General GAVIN. Oh, I don't know, sir. Sputnik I, I doubt. Sputnik II, 1,120 pounds, carries a lot more than a dog. I do not know what else is in it. I do not know that anyone else knows, besides the Soviet.

Senator JOHNSON. You think it is tragic, though, we were not there first?

General GAVIN. Yes, indeed.

Senator JOHNSON. Do you think we could have been?

General GAVIN. Yes, we could have been.

Senator JOHNSON. And the reason we were not—money?

General GAVIN. No, wrong decision.

Senator JOHNSON. What was that decision that was wrong?

General GAVIN. Why was it wrong, sir?

Senator JOHNSON. What was the decision that was wrong? Which decision do you refer to?

General GAVIN. Well, this has been a rather difficult experience, I would say, for the Department of the Army, and I have been personally party to a great deal of the action.

It goes back to the first discussions when Dr. von Braun and the other Army people first worked with the Navy in 1954, the winter of 1954-55.

A number of proposals were worked up and, as you know, sir, the first decision was made in August of 1955 finally—well, the first one, the final decision that the Jupiter C proposal, Project Orbiter as it was known as, would not be adopted as the national satellite program.

On the 15th of August, General Simon, who was Chief of Research and Development of the Ordnance of the Army, sent a paper to the Department of Defense analyzing the Vanguard proposal, pointing out the serious damage that could be done to United States prestige if we did not launch first, and the apparent shortcomings, as he understood them technically, in the Vanguard program. This was the 15th of August 1955.

Nevertheless, the programs went along, and we followed it very closely, and anxious and willing to help.

In the spring of 1956 we made a proposal to the Department of Defense that apparently was considered.

In May of 1956, General Daley, on my right, and Dr. von Braun, made a proposal to the Department of Defense that we go ahead and launch a satellite, and finally on the 15th of May, I believe it was, I received a directive telling me in specific terms that the Army would not prepare to launch a satellite using its Jupiter or Redstone missiles.

Well, we followed the programs quite carefully, the Soviets and our own, and finally in September of 1956, we then launched a missile that was announced as having flown 3,300 miles, and quite a few hundred miles into outer space. That essentially was the configuration that we had proposed using.

Secretary Brucker, a couple of months later after we took quite a bit of time to study it again, reopened the issue and urged that we be allowed to go ahead and provide the country with a satellite, estimating that we could fly one by midsummer of 1957; that is just this past summer. Again it was turned down.

By spring and summer of 1957 I became quite worried about it because I was following the Soviet program very carefully, and they appeared to be approaching the real possibility of launching.

At that time, I asked General O'Meara, my deputy, in June of 1957, to go down and talk to Dr. von Braun about it and ask him what we ought to do next, because obviously we had made about five tries to get started but could not get our programs approved.

In our opinion, the Soviets were getting close to launching; national prestige was going to suffer a serious blow, and we talked to Dr. von Braun about it in June of this year, about where we should go next.

We even talked about the possibility of denying satellite intrusion in the event that it were unusually effective, a military satellite rather than a small, let us say, purely scientific satellite.

Well, on August 26, you may recall Mr. Khrushchev announced that they had fired an ICBM into the target area. His words were very carefully chosen.

We analyzed that, and I became satisfied then that they were on the threshold of launch, because he had achieved a multiple-stage rocket with a good main thrust unit.

ON SEPTEMBER 12 THEY PREDICTED LAUNCHING WITHIN 30 DAYS

On the 12th of September we had a meeting of our scientists in the Department of the Army, and at that time Dr. Hovde and Mr. Morse of Boston, and Dr. Carmichael and others were there, and we talked to them about what we had been doing and our concern, and at that time I told them that in our opinion the Soviets would launch in 30 days.

Well, we took about 2 weeks worrying about this one.

On the 1st of October we prepared another proposal to go to the Department of Defense that would, if approved, allow us to get going as fast as we could.

We did not send that out and, of course, on the 4th of October they launched.

This has been a very frustrating—and that is an understatement—experience, to have been through in the last 2 years.

Now, fortunately, we are allowed to go ahead, and we are getting ready as fast as we can.

Senator JOHNSON. Then, perhaps, there may be a blessing in disguise after all.

General GAVIN. Mr. Chairman, I hear people say that. I wish I could share your feeling.

Senator JOHNSON. Well, you have become somewhat unshackled, have you not?

General GAVIN. Yes, we have; in that respect, it certainly has been.

Senator JOHNSON. If you had remained in a straitjacket, you would not have had much possibility of surviving.

General GAVIN. We would surely be much worse off.

Senator JOHNSON. Well, maybe it is not a blessing, but it would be fair to say you are much more optimistic than you were in October?

General GAVIN. Well, yes; although now we realize the Soviet achievement is of a higher order than we anticipated it would be. I think we can say that fairly.

Senator JOHNSON. Now, you realize, of course, that we consistently underestimated the Russians. We underestimated the Russians on the A-bomb and on the H-bomb. Do you think we underestimate them now on the missile?

General GAVIN. Oh, yes; I would say so.

Senator JOHNSON. Do you think we underestimated them on their other capabilities, such as the equipment that you have shown on the charts?

General GAVIN. Oh, we did that; yes, sir.

Senator JOHNSON. What is our national survival picture vis-a-vis the Russians'? Are we behind? What is your opinion?

General GAVIN. Well, sir, national survival covers a great deal of territory: political, economic, sociological, and so on.

From the straight estimate of balance of military power, our position is exceedingly difficult, I would say, at the moment.

WE ARE BEHIND RUSSIA IN MILITARY CAPABILITY

Senator JOHNSON. You think we are behind?

General GAVIN. Yes, I would say we are.

Senator JOHNSON. General, I noticed you measured your words. Do you think we are behind Russia in military capability at the moment?

General GAVIN. In the broad spectrum, and considering how it could be applied, I would say, yes, we are.

Senator JOHNSON. Have you considered your reply to that question?

General GAVIN. Yes, I believe I have.

Senator JOHNSON. What are we doing to catch up?

General GAVIN. Well, we are just pushing about as hard as our present resources will allow.

Senator JOHNSON. Do you think we are really pushing as hard as our resources will allow?

General GAVIN. I speak of the resources made available to us; we are trying to do the job.

Senator JOHNSON. But you do not think we are pushing as hard as our resources would permit if we decided to go all out.

General GAVIN. Oh, I think, in my personal opinion more of the national product could be put into defense.

Senator JOHNSON. We are pushing more today than we were yesterday, and we were pushing considerably more yesterday than we were pushing 2 months ago, are we not?

General GAVIN. Yes, I would say so.

Senator JOHNSON. What would you attribute that the effect of Sputnik I and II has had upon the thinking of this country?

General GAVIN. Oh, yes; I would say this had a very significant impact on our thinking.

Senator JOHNSON. I think your statement, General, is a very courageous one, a very comprehensive one, and I have every reason to believe, a very accurate one. I do not know that I have ever met you before. I certainly have never discussed this with you before, but I think it is going to have a very definite impact if it ever gets out to the country, and the people can read and hear what you have said to this committee.

Do you think that we are behind just temporarily? Do you think we will catch up and forge ahead and remain a leader—do you think we will regain our leadership militarily?

WILL TAKE MANY YEARS TO CATCH UP

General GAVIN. Well, of course, we must see to it that it is temporary. But this is going to take a lot of work and a lot of time. I have some concern myself about this. I noticed that Dr. Teller, I believe, gave an estimate of about 10 years.

I would say with an all-out effort, all-out effort, beginning right with the training of our youth in schools in the necessary science courses, rather the encouragement of science courses, things of that sort, we have quite a few years of very hard work ahead of us, quite a few.

Senator JOHNSON. Are you familiar with the deliberations of this committee? Have you followed them since we started with Dr. Teller?

General GAVIN. No, I have not—just in the newspapers, I would say, sir.

Senator JOHNSON. I am talking about the reports of our activities.

General GAVIN. Yes, sir; I have.

Senator JOHNSON. Would you have any suggestions to make as to how we could act more constructively to bring this to the attention of the American people?

General GAVIN. No; I think the American people are quite concerned.

In my visits around, and I visit research and development installations and have other occasions to travel about, I meet veterans wherever I go, men I knew during the war, and without exception I find people are very deeply concerned, in my opinion.

I should add, I suppose, sir, that my comment on the relative military position is, of course, a personal one, and in making such an estimate, I would equate everything I know as to capabilities and probable methods of using power available around the periphery and limited engagements, a series of limited engagements, in such a way as never to pose a clear black and white issue, and with the proper application of the resources available to them, I would say their position looks very good; it must to them at this time.

Senator JOHNSON. Don't you think that the committee and the individual Members of Congress and the leaders in the services ought to continue to do everything they can to see that the American people are fully and adequately informed so that they are prepared for the decision that we must make, and steps we must take, if we are to survive?

General GAVIN. Yes, of course I do.

Senator JOHNSON. Do you have any criticism of the conduct of this committee in that respect?

General GAVIN. Of course not; no.

Senator JOHNSON. Would you give the committee your opinion of the basic weak spots in our research, just 1, 2, 3, as you see them?

MORE BASIC RESEARCH AND FEWER COMMITTEES NEEDED

General GAVIN. Basic research, first of all, we need more.

Next, the decisionmaking processes so that, from concept to inventory, things move fast. This must be stepped up.

This, at the present time—at the present time the greatest retardation occurs, perhaps, in a committee system that is used at the present time. With the organizational changes that I suggested, I believe that the process could be stepped up significantly.

And then, third, an adequate investment of our national product in national defense overall.

These three steps, basic research, decisionmaking processes expedited, and then adequate investment of resources, all three in that order, I believe, would be worthwhile.

Senator JOHNSON. Do you know of any other opinion in high circles of the services that shares your view of the relative capabilities of the United States and the Soviet Union? Do you believe your viewpoint is generally shared by men of your—

General GAVIN. No, I do not know that I am in position to say, sir. I think each would have to speak for himself, which is what I have done in this case.

Senator JOHNSON. Well, I understood you spoke for yourself, but do you find in your associations that you are alone in your viewpoint?

General GAVIN. Well, I would put it this way, sir:

We in the Army, of course, are quite deeply concerned. We take these young men into the Army and take them overseas.

When policy requires, we commit them to combat. We are facing a very tough, very able, aggressive opponent, roughly on the order of 175 divisions, equipped with good missiles, nuclear warheads, an opponent that can call on satellites for a great deal of backup. This is an impressive foe for the Army to face.

Furthermore, at least in the pattern of combat so far, the Army has taken the largest brunt of the battle losses.

When all the promises were over and everything that was going to be done to make war highly automatic and pushbutton, when we got through with Korea, 96.5 percent of the casualties were soldiers on the ground.

OUTLOOK FOR ARMY IS GRIM

Senator JOHNSON. General, all that adds up to the reason why there ought to be some other people who feel as you do. Don't you know some in the Army that do?

What I am trying to find out is if yours is an isolated viewpoint or whether it is shared by some of your associates.

General GAVIN. Well, sir, they are concerned for these reasons. I am trying to explain why the Army feels as it does. I think we are facing a very tough prospect.

Senator JOHNSON. I can understand the reasons why they are concerned. I want to know if there is anybody else concerned besides you; I would feel a little better if there are. I want to know if there is anybody else concerned besides you.

General GAVIN. Of course, there are.

Senator JOHNSON. You think the opinions expressed to this committee are shared at least by a substantial segment in your service?

General GAVIN. Well, I would hesitate to be that specific.

Senator JOHNSON. I do not say majority.

General GAVIN. I would say a sizable portion of the Army would feel that way.

Senator JOHNSON. All right.

My staff says that I have got 1 more minute, and I am going to try to get through as quickly as I can.

I want to ask you to make a comment very briefly on the suggestions made by various groups that the committee has contacted.

On the first suggestion, which is that the United States urgently needs to bring its missile-satellite-space program under an independent civilian commission, what brief comment would you have to that? Would you favor it or oppose it?

General GAVIN. Well, briefly, it may have merit, and it certainly would do better now than in the past.

However, this is a symptom of the ill itself, the fact that we have to get one man to head it up. If the organization were properly arranged, we would not have to take measures of that sort. However, this would work, and it would work better than it has in the past.

Senator JOHNSON. However, you might not require a civilian commission provided they gave one person authority?

General GAVIN. That is right.

Senator JOHNSON. Two: There is need for a permanent, competent and adequate staff in the Defense Department to provide leadership in basic and applied research.

General GAVIN. Yes, sir; I do believe in that second recommendation.

Senator JOHNSON. You agree with that?

General GAVIN. Yes.

SHORT-TERM FUNDING VERY UNSATISFACTORY

Senator JOHNSON. The third recommendation is: The research and development program should be on a 3-to-5-year basis instead of an annual basis?

General GAVIN. Oh, sure. Nothing is worse than this year-to-year business.

Senator JOHNSON. When you keep turning it on and off.

Four: Contractors should have more leeway to make technical decisions?

General GAVIN. Yes, sir; I would say so.

Senator JOHNSON. Five: Reduce lead time by making firm and early decisions?

General GAVIN. Yes.

Senator JOHNSON. You agree with that?

General GAVIN. I agree with that.

Senator JOHNSON. You enthusiastically agree with that one.

Six: Eliminate overtime restrictions?

General GAVIN. Well, certainly now; yes.

Senator JOHNSON. General Gavin, you have been most frank and candid in your testimony before this committee. Some of the things you said appear to not be in complete accord with others who have appeared to date, with statements that have been made to the press by senior officials.

Do you anticipate any criticism as a result of your very frank response to the questions that have been propounded to you?

General GAVIN. No, sir; I do not.

Senator JOHNSON. I want to commend you on your testimony, on your frankness, on your candor, on your patriotism, and I am a great admirer of yours.

Senator SALTONSTALL?

Senator SALTONSTALL. Mr. Chairman, just a very few questions of General Gavin.

General GAVIN. Yes, sir.

Senator SALTONSTALL. You are always stimulating whether you are in a public speech or as a witness.

Do I understand you to say that you believe that there should be amendments to the Unification Act to permit a different method of planning, advising the Secretary of Defense and the authorities that are leading our defense effort?

General GAVIN. Yes; this is what I suggest.

Senator SALTONSTALL. In other words, that requires some legislation to change the operation of the Joint Chiefs of Staff as they now exist?

General GAVIN. Yes; that is right, sir.

Senator SALTONSTALL. Have you gone into detail as to that, or is that just a general idea on your part?

General GAVIN. Well, I have gone beyond just a generalization of it. I have thought it through quite well, but not to the point of writing out on a piece of paper all the details, sir.

Senator SALTONSTALL. Now, you believe that research and development of military equipment, particularly in the Army, should be stimulated? Should there be more authority for a decision? I understood you to say you thought there ought to be less committees, and somebody ought to have authority; is that correct?

General GAVIN. That is correct, sir.

Senator SALTONSTALL. And you are willing to give that authority to act to Secretary McElroy or his delegate?

General GAVIN. That is right, sir.

Senator SALTONSTALL. And you are willing to follow down the line; in other words, if they should tell the Army that they should not do certain things or that they should do something else different from what they are doing, then you believe that that is the kind of authority that we should have?

General GAVIN. Well, this authority would be inherent in the organization I propose.

I would think that the Secretaries of the separate services, too, would have their own authority in their own areas to get on with programs that they considered essential within the resources made available to them.

Senator SALTONSTALL. But if we are going to work with the money available and with the need for acceleration you have got to have an overall authority, have you not, over the three Secretaries?

General GAVIN. Yes, sir; yes.

Senator SALTONSTALL. And that authority has got to be pretty near absolute?

General GAVIN. Yes.

Senator SALTONSTALL. Finally, you believe there should be more money available for research and more money available for production of military equipment?

General GAVIN. Yes; I do.

HAS MAINTAINED CONSISTENT POSITION

Senator SALTONSTALL. And that was your same testimony to the Symington committee a year or so ago?

General GAVIN. Yes, sir; I believe that is so.

Senator SALTONSTALL. Just one other question:

You have stated to the chairman of the committee that you believed we are behind the Soviets in military capabilities today; am I correct in my statement, sir?

General GAVIN. That is correct, sir.

Senator SALTONSTALL. From listening to much testimony in the Symington committee and in this committee, I have had great confidence in the present capabilities of the SAC, the Air Force, the B-52's, and the B-47's, and believe that we should build up and maintain that Air Force until we have operational missiles, can develop missiles.

Have you not confidence in the capabilities of the SAC Air Force today?

General GAVIN. Yes; I have, indeed.

Senator SALTONSTALL. To retaliate?

General GAVIN. I have, indeed, and I think we should have the finest SAC that we can possibly obtain. I wish it had more missiles in it now than manned bombers.

HE HAS TAKEN SAC INTO CONSIDERATION

Senator SALTONSTALL. But when you say that we are behind the Soviets in military capabilities, have you taken into account the overall effect of the retaliatory power, the devastating power, of the SAC Air Force today?

General GAVIN. Yes, Senator Saltonstall.

I would go one step farther: I would say, I would also bring in probable methods of employing power which I referred to a moment ago, with the capability the Soviets have, the versatility they apparently have, and the impressive array of land vehicles, with the type forces they have, I can see the possibilities of applying power in their own way on their own initiative in such a way as to never give us a black and white issue, and I would also include probable method as well as to quantity and quality of what they have.

Senator SALTONSTALL. In other words, your estimate is based on the overall situation of the Army, the Navy, and the Air Force as compared with the Soviet Army, Navy, and Air Force?

General GAVIN. This is true, sir.

Senator SALTONSTALL. Thank you, Mr. Chairman. I have no further questions. I appreciate listening to you, General.

Senator STENNIS. General Gavin, I do want to thank you for your testimony. I have heard you on previous occasions on different parts of this subject, and I was glad to hear you say that you have not been restricted in any way, and that shows clearly that an officer that

really wants to can come on out here and say what his opinion is, and those opinions are very helpful indeed. We feel like that even if it is not correct, it is at least not canned.

General GAVIN. Yes, sir.

Senator STENNIS. I certainly think that parts of yours are certainly correct. You say you feel you are safe from any retaliation, and I certainly hope that that is correct, and I believe it is correct, too.

General GAVIN. I believe it is.

Senator STENNIS. I am impressed with what you say: that you think now the overall, the entire military strength of Russia is greater than the entire military strength of the United States; is that correct? Did you mean to put it that way?

General GAVIN. I think that the question was a little different, to which the affirmative answer was given, sir. I believe it was the relative military strength, and this would include more than just military power. It includes a number of things. I think it was a little different than that as asked.

Senator STENNIS. Yes; I think the question was different. But I wanted to know if you intended to include the meaning here that I put in my question. The overall striking power and the military power combined with Russia was greater than that of the United States. Do you mean you think that that is true?

General GAVIN. I am not—

Senator STENNIS. If that question does not state it the way you see it, why, you rephrase it, if you will, because I think you have given a very important answer there, telling us everything.

General GAVIN. Yes. I would like to refer to the question earlier, in the record. It was more in the order of our current relative capabilities are such that they are in better position than we are. It is more in that order.

Senator STENNIS. You mean their current relative capability including their probable missile strength?

General GAVIN. That is right.

Senator STENNIS. Makes them a stronger military power than is the United States?

General GAVIN. I would say so, sir.

IF WE BEND TO THE TASK WE CAN MOVE AHEAD

Senator STENNIS. With some time for us to rebuild and build further, do you think that our full capacity, once having been put on the line, do you think our capacity is great enough to overcome any superiority they may now have?

General GAVIN. Unquestionably in my mind, unquestionably. If we really put our minds to the problem and put our resources into it, we can show daylight between ourselves and the Russians.

Senator STENNIS. May I go back to a question that I have asked most other witnesses. Mr. Holaday testified today that he was director of the missile program. Still it turns out that his authority is limited by the Secretary of Defense, and I am not speaking of persons now, limited by the Director of the Budget, even though the money has been appropriated, and all those that are working on any programs everywhere in the military or elsewhere know that he has this limited authority only.

Do you think that so far as director of missiles is concerned, that he can get the job done, make plans and get the job done with such limited authority?

General GAVIN. I believe that he could, sir. Of course, he has got to get money.

Senator STENNIS. Yes, assuming there will be appropriations.

General GAVIN. Yes; I would say he could.

Senator STENNIS. Is it fair to you to ask if you think such a program is in motion now and really making headway?

General GAVIN. In motion is a good description, I would say; yes, sir.

Senator STENNIS. I beg your pardon.

General GAVIN. In motion is a good description of it, something that is moving and getting done. The basic thing I think here is, is this missiles czar to be outside of the Secretary of Defense or within the responsibility of the Secretary of Defense? If it is to be within, the way it is is fine.

Senator STENNIS. Yes. I am satisfied for it to be within if that is really going to get the job done. But we have been appropriating a world of money and had understood that these programs were moving along a great deal better than we now understand they are. At least that was my impression. Without looking for anyone to blame personally, I think the system must be bad or some individual ones. I would rather believe the system has been bad. It does not seem to me much has been done since this new start has been made or this new realization of this Sputnik No. 1 went up. We appoint more committees and all, but so far as investing someone with know-how to make a definite positive drive on this thing, to plan and then carry out the plan, I don't see where much has been done.

We have to assume that everything is going to be changed and different and better without any different plan or without any additional authority to move.

That is why I don't believe it is yet off dead center, to be frank about it. You say you think it is?

General GAVIN. Things are in motion, as you said, sir.

Senator STENNIS. Your testimony has been very helpful. I think the Nation will be helped. That is all I have, Mr. Chairman, thank you.

Senator Bush, I believe, is next.

Senator Bush, do you have any questions?

PREFERS TO CALL IT A "SENIOR UNIFIED STAFF"

Senator BUSH. General, I would like to go back to your statement about the Joint Chiefs of Staff and also to Senator Saltonstall's question on that point.

I gather from what you said, if I recollect it, that you have in mind a modification of the law which would do away with the Joint Chiefs of Staff but replace it by a general staff or something of that order.

In other words, my question is, is your suggestion in line with the proposition that we should have not just a planning staff but a general staff which is operational and a command organization of itself a unified command rather than just a planning organization like the general staff.

Is that what your—

General GAVIN. Yes, I would say that is it except for the words "General staff."

I would say a senior unified staff.

Now the thing that disturbs a number of people, and I am included, that have worked in the Department of Defense for some time, is that there is no operational staff within the Department of Defense staff, and in the event of war it would have to be reorganized to function I would presume.

Senator BUSH. What is the difference between what you are telling us and what we hear of as a general staff as exemplified let's say by the German organization during World War II?

General GAVIN. Yes. May I say before I answer that the Joint Chiefs of Staff might be kept—three senior military advisers could be kept as a group to advise the Secretary of Defense, I would say perhaps after they have left their service, so a group like that might be useful as elder statesmen, let us say, in military affairs.

Senator BUSH. Yes.

General GAVIN. To get back to the last question, I am not sure, sir, what the words "general staff" mean to you.

Our staff organization is not like the German staff organization. It is quite different. But functionally we break it down along rather well-understood lines of personnel, logistics, intelligence and operations, and then is added research and development and so on.

It would be a staff like that, a staff much the same as Mr. Brucker has available to him today and Secretary Douglas has available to him also, something of that sort.

Senator BUSH. To me I mean a general staff, I probably do not understand the term in the military sense as you do, but what I had in mind is a unified command.

In other words, this has come up before, and we do have it in places.

General Norstad has a unified command.

General GAVIN. That is correct.

Senator BUSH. And so forth.

What I am getting at here is, would not the Secretary of Defense and all of us be better off if instead of having the Joint Chiefs as simply a planning organization, which I understand it is—

General GAVIN. Yes.

IT WOULD BE A UNIFIED COMMAND—SAYS GENERAL GAVIN

Senator BUSH. If we had in their counterpart or in the substitute setup for them a real unified command, which would really have command over the Army, Navy, and the Air Force?

General GAVIN. Well, in effect this is what it would be, with of course the Commander in Chief being the President, and the Secretary of Defense then really exercising the functions of the office in a command way; yes.

Senator BUSH. Would you care to offer any further observations on the question of the unified command than you have already said, or do you want to stand on just what you have already said in that connection?

General GAVIN. Well, sir, except to perhaps add once again that our experience in running large geographic areas and carrying out

great responsibilities in large theaters has made quite clear to us that you can unify staffs.

You can get the fine military competence of all services into these staffs and get good professional judgment brought to bear on the problems of the man in charge, and this is all that we suggest doing in this case.

Senator BUSH. So, in a general way you are thinking that more unification would be a better thing, would be a good thing for us?

General GAVIN. If this is the way you would describe it, I would say so; yes, sir.

Senator BUSH. In your estimate of the relative strength of ourselves and the Russians, do you take into account the factor that they would be the ones that would likely start a war if one were started, and the fact that we are inhibited by everything I guess, custom—

General GAVIN. Yes.

Senator BUSH. Morality, whatever.

General GAVIN. Yes.

Senator BUSH. From doing it?

In other words, we just assume, the people of our country just assume that we would not start the war.

We assume if there is going to be one, that they would start it, and with the effectiveness of modern weapons that would likely be used at the, used against us at the very outset, the handicap which we would endure would be it seems to me enormous, because of the fellow that starts it this time would seem to have a very great advantage.

General GAVIN. Yes, sir.

RUSSIA HAS THE CHOICE

Senator BUSH. Far greater than perhaps he ever had before.

Now I wondered whether you had taken that into account in making your estimate of our relative position?

General GAVIN. Oh, yes, I did, sir, and I would like to make clear again that method was considered, and they do have the initiative and can elect a course of action.

I have brought up a number of times here the words "limited war." They can engage with the type force they now have, in an effective way, around the periphery of their area of interest and this is for them to do or not.

Senator BUSH. I thought that that was what you intended to do, and my question was only to clarify that point.

General GAVIN. Yes.

Senator BUSH. It seems to me it is a very important one in connection with our position vis-a-vis them today. I don't have any other questions, but I do want to join with my colleagues here in thanking the General for a very clear and concise statement, his willingness to answer almost every conceivable question.

It has been a most admirable presentation.

Senator JOHNSON. Thank you, Senator Bush.

The Chair is delighted to note the attendance of our colleague, Senator Mundt.

Senator Symington, we want you to take the witness now.

Senator Mundt, at the conclusion of Senator Symington's questions, if you have any questions we would be delighted to have you participate because we know you can make a contribution to our hearing.

Senator Symington.

Senator SYMINGTON. Thank you, Mr. Chairman.

Senator JOHNSON. Take as much time as you want.

We are not advocating that we stay here all night, but we do want you to spend a substantial time because this will be the last witness.

We don't expect to hear any more after we finish with the general. Tomorrow we will have General Medaris and Dr. von Braun and Dr. Martin and Secretary of the Navy Gates, the Chief of Naval Operations, Admiral Burke, Rear Admiral Clarke, Rear Admiral Hayward, Rear Admiral Rayborn, Rear Admiral Wheatley, and Assistant Secretary for Air Garrison Norton, but this will be the last witness this evening.

The witness is yours, Senator Symington.

Senator SYMINGTON. Thank you, Mr. Chairman.

I will try to be brief.

General Gavin, I congratulate you on your testimony tonight.

It has been a privilege to know you and I am sorry that for many months we have not had a chance to discuss these matters.

We are finally getting out the facts to the people under the leadership of our counsel and our chairman and this committee, the only way democracy can live.

You were born in 1907; is that right?

General GAVIN. That is correct, sir.

Senator SYMINGTON. And you enlisted in the Regular Army in 1924, advancing to the rank of corporal, is that correct?

General GAVIN. That is correct, sir.

PASSED EXAMINATION FOR ENLISTED MEN TO GO TO WEST POINT

Senator SYMINGTON. And then you went to West Point through examinations given some enlisted men?

General GAVIN. That is correct, sir.

Senator SYMINGTON. You have risen, in other words, from an enlisted private to a lieutenant general, is that correct?

General GAVIN. That is correct.

Senator SYMINGTON. Your decorations are such I would not want to read them. It would take too long. But it is a fact, is it not, that in addition to being decorated by a great many other countries, you have every medal for valor this country can give except one, is that correct?

General GAVIN. That the Army can give, sir.

Senator SYMINGTON. Right?

General GAVIN. Yes, sir.

Senator SYMINGTON. Incidentally I see you were decorated by the Russians.

How come?

General GAVIN. Yes, indeed. I expected to be asked that someday.

Senator SYMINGTON. Well, we might as well ask it now.

General GAVIN. I forget how that worked out.

As I recall, we were in those happy honeymoon days in May of 1945 and we traded decorations back and forth in the interests of good will and so on, and I became the recipient, quite surprisingly of one.

Some of my colleagues had a lifetime pass to ride the Moscow subways.

I was not so fortunate.

Senator SYMINGTON. You have the Purple Heart for being wounded in action, is that correct?

General GAVIN. That is correct, sir.

Senator SYMINGTON. Listening to your testimony you talk like General Collins, General Ridgway or General Van Fleet.

It is mighty refreshing.

You know about the Cordiner report?

General GAVIN. I do, sir.

Senator SYMINGTON. Do you approve of it?

General GAVIN. I do.

Senator SYMINGTON. Do you think that the adoption of many if not most of its suggestions would improve the morale and efficiency of the Armed Forces?

General GAVIN. Yes, I certainly do.

SMALL WAR COULD ERUPT INTO LARGE WAR

Senator SYMINGTON. In the air power hearings on June 18 1956, General Taylor testified:

If the small war breaks out, we must suppress the war promptly because that small war may easily lead to the great war which we are all trying to avoid.

Do you agree with that?

General GAVIN. I certainly agree.

Senator SYMINGTON. We have had a lot of talk about missiles, and I am anxious we chase the Russians in the missile field. But it is true, is it not, that, if we were forced into a fight today, tomorrow, or next year, we have to fight with forces in being, existing forces; is that correct?

General GAVIN. Yes; that is correct. And, of course, this bears on my answer to the question a moment ago about relative capabilities, this matter of timing and method and what can really be done.

Senator SYMINGTON. In your opinion, so far as the Army is concerned, is it ready and capable to suppress successfully, based on our international commitments, any of the small wars General Taylor referred to?

General GAVIN. "Any" covers a great deal of territory. It could deal with some.

Senator SYMINGTON. How many divisions have we now?

General GAVIN. I believe we have about 15 now.

Senator SYMINGTON. How many of those are combat ready?

General GAVIN. I would hesitate to give you the exact figure on that. I really work mostly in research and development. I could give you an estimate.

Senator SYMINGTON. Take a guess.

General GAVIN. I will take a guess of about, combat ready, perhaps about 10 or 11, and the remainder would be in training, you see, for the other divisions.

Senator SYMINGTON. How many of those are mechanized?

General GAVIN. I would estimate, of those, about three.

Senator SYMINGTON. Not counting the Chinese divisions, how many divisions do we estimate the Russians now have?

General GAVIN. 175.

Senator SYMINGTON. And how many of those are mechanized?

General GAVIN. I am not sure, but I would say it is very high now. They have been mechanizing their divisions at a very rapid rate. Nearly everything they have is on tracks and wheels right now. So, it would be of a high order, approaching 80.

Senator SYMINGTON. We hear a lot about atomic weapons. How many divisions have we adequately equipped with atomic and other modern weapons?

General GAVIN. Well, sir, we have nuclear weapons wherever we have divisions, and the missiles to deliver them, in limited numbers, and the ranges of the missiles are such that they support the divisions. That is, you do not have within the division so many nuclear weapons, although this is possible with Honest John-type weapons. But the range is such that you can get support from Corporals and the longer range missiles.

OPTIMUM PEACETIME ARMY, 28 DIVISIONS

Senator SYMINGTON. How many divisions do you think we should have, based on our international commitments?

General GAVIN. Well, sir, this is very difficult to say. I think that General Ridgway testified before Congress about 3 years ago that he thought an optimum peacetime Army under the conditions then prevailing was about 28 divisions, and I think that is a rather good figure. However, now you would need a great deal more in the way of missile-support commands, and the like of that.

Senator SYMINGTON. How many of those divisions do you think should be mechanized?

General GAVIN. I would say about—a very high number, on the order of about 14.

Senator SYMINGTON. General Taylor testified in 1956 that the Army budget requirements for the fiscal year 1958—

will be greater, primarily because of the modernization factor;

His testimony was that you would require "around \$12 billion, something of that magnitude," for fiscal year 1958.

Do you recall what you actually did receive?

General GAVIN. I am not sure, sir, but it was—I am not sure. I would like to provide it for the record.

Senator SYMINGTON. I think it was \$7.264 billion. In other words, about \$5 billion less than he said was essential in his previous testimony. Unless General Taylor's estimate was padded—you do not think it was, do you?

General GAVIN. Of course not.

Senator SYMINGTON. Or world conditions have materially improved—and you do not think they have, do you?

General GAVIN. No; they have not.

Senator SYMINGTON. A cut of \$5 billion must have required substantial curtailment in the Army's modernization and structure, which General Taylor thought was necessary; is that not a fair deduction?

General GAVIN. Yes, sir; that is so.

REDUCTIONS IN ARMY NOT REPLACED SINCE SPUTNIK I

Senator SYMINGTON. Since the budget was originally presented to the Congress in 1958, there were heavy reductions made in the Army in such things as research and development, in maintenance and operation, in personnel, and, as we know, in procurement. To the best of your knowledge, since October 4, 1957, have any of those reductions been replaced?

General GAVIN. This is in 1958 money, now?

Senator SYMINGTON. Yes.

General GAVIN. No; they have not.

Senator SYMINGTON. And so, if there has been anything done by us in the way of acceleration, the Army has been left out, with the exception of its missile program; is that correct?

General GAVIN. Well, there has been no augmentation of 1958 funds since October 4.

Senator SYMINGTON. No increase?

General GAVIN. That is right, no increase; that is right, sir.

Senator SYMINGTON. Thank you. Now, due largely to cuts by the administration from the original budget submission, the amount actually appropriated for the fiscal year 1958 for the Army was about \$300 million less in new money than for fiscal year 1957. What do you think about that?

General GAVIN. Well, sir, my primary, let us say, preoccupation these days is with research and development, and my budget was cut.

Senator SYMINGTON. It was cut.

General GAVIN. Yes, sir; it was. In fact, you may recall I defended a budget of \$372 million before Congress, and some of that was withheld, and I have been operating on the prospect of \$355 million, and then Jupiter was funded out of the money that was withheld.

Senator SYMINGTON. In other words, except for some work that was done on Jupiter, which, of course, has moved more into the news as a result of sputnik, our reaction to the Russians' stating they had the ICBM and launching the satellites, so far as the Army is concerned, is to heavily cut research and development in the fiscal year 1958 funds and to maintain those reductions. Is that correct?

General GAVIN. Well, so far, there has been no increase.

Senator SYMINGTON. Then my statement is right, is it not?

General GAVIN. That is correct.

Senator SYMINGTON. In 1952, General Eisenhower referred to, and I quote:

Our defense program has suffered from lack of farsighted direction. Real unification of our Armed Forces is yet to be achieved.

He also said:

Service disagreements have become public brawls.

Would you care to give the committee your current views on the state of unification in the services? Has it improved or has it not improved?

MORE SERVICE COOPERATION THAN THERE IS DISAGREEMENT

General GAVIN. Well, I am not sure what people mean by "unification" in reference to interservice controversy. It has not been

harmful. It apparently does become so in committees, at times, in the Department of Defense, and thus impacts on our programs.

But actually, there is more interservice cooperation than there is disagreement. We are getting on quite well. I know this from personal experience.

Senator SYMINGTON. I am glad to hear that.

Now, you yourself, on May 22, 1956, said:

The Department of Army programs in missiles and aircraft are intended to give it a capability of fighting successfully in any war or police action short of war in which our Nation may find itself.

Could you give this committee your best judgment as to how far short of this expressed intention the Army's capability is at the present time?

General GAVIN. I would hesitate to put a finite figure on it in terms of divisions, which I presume is what you desire. Modernization is terribly important as well, so both quantitatively and qualitatively I believe we should be better off than we are.

I think the figure I gave you earlier of an optimum Army of about 28 divisions is one that I would stand by, and it should be modernized and backed by adequate missile support.

Senator SYMINGTON. Is this lack of modernization or lack of quantitative or qualitative superiority the result of insufficient funds or lack of interest on the part of the Army?

General GAVIN. Well, just put that way, black and white, of course, there is no lack of interest on the part of the Army, so it must be funds, but there are other things, than just funds involved. There is decision making and how funds are used.

MORE MODERN ARMY AWAITS BETTER FUNDING

Senator SYMINGTON. The net of it so far as you are concerned, and I just want the record to be clear, is that our Army would be more modern and it would be larger if there were, in your opinion, adequate funds.

General GAVIN. Yes, I would say so.

Senator SYMINGTON. The Russians seem to have enough funds, do they not?

General GAVIN. Apparently so.

Senator SYMINGTON. In a recent book, Mr. Baruch said he would never agree this country couldn't spend as much to defend its freedoms as any other country could spend to destroy those freedoms. Will you agree with that?

General GAVIN. Yes; of course I would agree with that.

Senator SYMINGTON. You would?

General GAVIN. Sure.

Senator SYMINGTON. Why do you think it is the Russians are spending so much more of their gross national product, with the announced intention of destroying this country, than we are?

General GAVIN. Maybe Mr. Khrushchev meant it when he said, "We will bury you."

Senator SYMINGTON. Do you think we are going to catch up with the Russians?

General GAVIN. I am worried. We have got to do a lot more hard work than we have done so far in the last 10 years.

Senator SYMINGTON. You agree with Dr. Teller on that?

General GAVIN. I do agree with Dr. Teller.

Senator SYMINGTON. You believe that if we don't have a sharp change in our approach to this entire problem, psychological as well as physical, and a recognition of the danger instead of all this soft talk, complacency, we will be in a position where we might find ourselves, definitely inferior in strength. Is that correct?

General GAVIN. Yes; I would say that is so, and that motivated me in saying what I said here this evening.

Senator SYMINGTON. General, those of us who would like to get the facts before the people at times are accused of being hysterical or panicky. Do you think the work of this committee has any hysteria or panic in it just because we are trying to develop the facts so the American people will understand their position?

General GAVIN. No, I don't at all, no.

Senator SYMINGTON. Around last May 22, you said:

We are confident we will achieve the first 1,500-mile ballistic missile capability in the Western World.

I presume that had to do just with the Western World, did it not?

General GAVIN. Yes.

Senator SYMINGTON. How do you feel about that now? Are you still confident we will be the first in the Western World?

General GAVIN. In the Western World, yes, oh, yes.

THE "PRICE" OF PUTTING THE ARMY IN INDOCHINA

Senator SYMINGTON. Getting back to some of the previous problems, it is true, is it not, back in 1953, that General Ridgway did not want to put the Army in Indochina because of lack of strength?

General GAVIN. It wasn't quite like that.

Senator SYMINGTON. Would you state how it was?

General GAVIN. Actually, I was his chief planner at the time, and we made estimates and calculations as any prudent staff would in case of any contingency of this sort.

I am saying this to make clear that there was no intent to put a plan into operation, and it was quite apparent at that time that to embark on a commitment of force of the magnitude required there would require more than the use of the forces in being.

You would have to call up certain reserve forces, the National Guard, to be exact, open facilities, open production facilities, and so let us say there was a price tag put on the undertaking, and General Ridgway was quite ready and the Army was quite ready to do the job if the proper authorities were ready to pay the price, and it meant doing more than you could do with the forces in being.

Senator SYMINGTON. It meant more than you could do with the forces in being?

General GAVIN. That is right.

Senator SYMINGTON. How long would it have taken, at the time of the crisis of Indochina in 1953, how long would it have taken to get the forces in being?

General GAVIN. Yes, it would require calling up quite a number of National Guard divisions, sir, and bringing in reserves and opening facilities and so on, and it would have taken some time.

This was an ordinary measure of prudent backup. You could commit the forces you had, but of course without backing them up, you were inviting disaster.

Senator SYMINGTON. You are now in research and development, but nobody in the Army has had more battle experience than you, and few people more planning experience. I was in Europe last spring and talked to our people over there. The French commitment on NATO is 5 divisions, but they have considerably less than 1, is that correct?

General GAVIN. I would hesitate to confirm that.

Senator SYMINGTON. The British in their white paper in April reduced their European commitments, their NATO commitments, I believe, from 77,000 to an ultimate 41,000.

General GAVIN. It was on that order of magnitude, that is right.

Senator SYMINGTON. We of course have maintained over there what we said we would?

General GAVIN. This is true. We did.

Senator SYMINGTON. If you were worried about our situation with respect to Indochina, based on the tens of thousands of Americans over there today, with families, if you would take off your research and development hat for a moment and put on your planning hat with respect to what might happen if the Communists moved, you must have some rather sleepless nights, don't you?

General GAVIN. That is true.

Senator SYMINGTON. That is one of the reasons you said that you thought that overall that our military position is now secondary to the Russian position?

General GAVIN. Considering capabilities and methods available to both sides.

SOME OF THEIR EQUIPMENT BETTER—SOME OF OURS BETTER

Senator SYMINGTON. Thank you, General. Now you gave some photographs here, and showed that the Russian equipment is good; you already told us that they have about 10 times as many divisions as we have. Would you say that their equipment in their Army is qualitatively inferior, equal or superior to ours?

General GAVIN. It is both ways, sir. Some that we have seen is superior to ours, and we believe that others are inferior.

Senator SYMINGTON. Switching for a minute, Colonel Sigley testified in 1956 that he believed it would take between 150 and 200 million dollars of research and development funds to develop an antimissile missile. How much of that estimated amount do you know, roughly, that you have received?

General GAVIN. So far? I will get the figures on that in just a moment for you.

Senator SYMINGTON. Will you make them a matter of record?

General GAVIN. Yes, sir.

Senator SYMINGTON. Have you changed that estimate?

General GAVIN. That is a rather good estimate, I would say.

Senator SYMINGTON. Your testimony has been refreshing and informative. Why would the Russians ever want to fight an all-out war the way things are going? Wouldn't there be much more chance of their fighting a peripheral war?

General GAVIN. This colors very much my answer to relative capabilities because I believe this is the case. They would do much better to keep things in a grey area and move around the periphery in limited engagements, achieving limited objectives, yes.

Senator SYMINGTON. And yet we not only have not accelerated our conventional forces since sputnik. We have not yet replaced the cuts made in those forces during the year 1957, in the fiscal 1958 budget. Isn't that correct?

General GAVIN. I would say that is correct, yes, sir.

Senator SYMINGTON. That is an astounding piece of testimony.

General, you testified, and I quote:

If the Russians acquired one IRBM operationally reliable and accurate significantly ahead of us, it could make a great difference in our power position.

That was in 1956. As you know, the present Deputy Secretary of Defense said that the IRBM in Russian hands would not make "material difference in the balance of power."

Do you still stick to your position?

General GAVIN. Yes; I do.

Senator SYMINGTON. Do you still hold to your views as to the relative importance of IRBM's as attacking weapons against our foreign bases, as compared with manned bombers?

General GAVIN. I am not quite sure.

Senator SYMINGTON. I think in your testimony in 1956 you stated that an IRBM could be a more effective weapon?

General GAVIN. Yes.

Senator SYMINGTON. Against bomber bases?

General GAVIN. Yes, no doubt; oh, yes.

WEATHER IMPORTANT FACTOR

Senator SYMINGTON. I might say I completely agree with you on that, because whereas we were never turned back in World War II by enemy action, we were turned back a great deal by weather.

General GAVIN. That's right.

Senator SYMINGTON. And weather would not bother an IRBM.

General GAVIN. That is true.

Senator SYMINGTON. Do you think the Soviet is significantly ahead of us in operational capability of IRBM's today?

General GAVIN. Let us say the IRBM covers a spectrum—what shall we say, sir, eight to twelve hundred miles or somewhere in there?

Senator SYMINGTON. Or let us say anything from five to fifteen hundred.

General GAVIN. Yes. The answer is yes.

Senator SYMINGTON. You think so?

General GAVIN. Yes, I do.

Senator SYMINGTON. It wasn't necessary that they be ahead, was it? I mean we would have avoided being behind if we had tried harder, could we not?

General GAVIN. In my personal opinion we could have.

Senator SYMINGTON. How? What could we have done to avoid losing this race to the Communists?

General GAVIN. Yes, there has been—well, let's put it this way. We could have started our programs earlier and supported them

more fully in the late forties and even as late as the early fifties. To my personal knowledge we could have supported our missile programs much more fully than we did.

In fact, we were anxious to start an IRBM program in the Army in early 1955, and in fact, I had occasion to go to General Ridgway and talk to him about it in April of 1955.

Colonel Nickerson had come to talk to me about it several times that spring, and I talked to General Ridgway about it. There was quite a price tag on it.

As I recall, it was in the order of about \$25 million, and he took it under consideration, and several days later I talked to him about it and he decided that the money just wasn't available, so that we had better try austere to move the Redstone out to 500 miles or something of that sort, something in that order.

Senator SYMINGTON. In other words, the reason that the Russians are ahead of the United States in the IRBM field in your opinion is because of lack of funds?

General GAVIN. And early prosecution of a program. Time was involved here too, because funding is available now.

Senator SYMINGTON. If you had had the funds, you would have prosecuted the program, wouldn't you?

General GAVIN. That's right, but funds are available now.

MODERNIZATION OF ARMY TOO SLOW

Senator SYMINGTON. You testified in 1956 that American boys will suffer "more casualties" if we don't have the most modern equipment for peripheral wars. You also said "I don't feel we are modernizing the Army as rapidly as needed."

General GAVIN. That is true.

Senator SYMINGTON. Since that time the amount of money that has been available to you has been heavily cut for fiscal reasons instead of increased, is that not correct?

General GAVIN. Well, heavily, I would take advisedly. It has been cut, let us say—

Senator SYMINGTON. I think \$300 million was the figure?

General GAVIN. Yes, sir. The problem we have in research and development is that we have gone along on a steady level of effort, we have absorbed operation and management costs and other costs that in effect have reduced steadily the amounts going into research and development. The cut may have been a heavy one. In any case, it has been rather serious.

Senator SYMINGTON. In what major respects do you believe the Army is deficient today?

General GAVIN. In what major respects?

Senator SYMINGTON. Right, vis-a-vis the Russians?

General GAVIN. Well, I would say we should have a better family of tracked vehicles and this includes tanks, in the necessary categories, and personnel carriers. We should have a better family of surface missiles now. We should have an antimissile missile quicker than we are going to get it.

I would say in these principal areas, that is, the very essential mobility and modern fire power.

Now in addition, of course we should have more tactical and strategic air mobility than we have so that we could move the forces we have quicker. Within the Army itself, in my personal opinion, we should have a better family of our own organic air vehicles. These are the most important categories.

Senator SYMINGTON. If the Russians attacked Europe, based on your experience, do you think there is any effective ability to stop them over there unless we use nuclear weapons?

ADVOCATES NUCLEAR WEAPONS FOR LAND WAR IN EUROPE

General GAVIN. Well, sir, I have gone on record on this point a number of times. I think nuclear weapons are now conventional weapons, and they can be developed and are being developed for use against tactical targets both for protection against air attack as well as protection against land forces. I would say therefore absolutely, nuclear weapons must be used in land warfare in Europe.

Senator SYMINGTON. Now we set up a deal you might say, an arrangement, abroad, whereby we were to put in so much and other people would put in so much. That was based of course on relative strength. We have little over there comparable to what was agreed on, say at Lisbon.

What would happen if the Russians suddenly decided they would move in Europe, and warned us as they warned the French and the British in the Suez crisis in the fall of 1956, that they would give us an all-out hydrogen war if we resisted. Would we have a chance in Europe?

General GAVIN. This is quite a speculative question.

Senator SYMINGTON. That is right. It is a hypothetical question.

General GAVIN. I do believe it would be quite inappropriate for me to give an opinion on this because you set up a series of assumptions that may or may not come to pass.

Senator SYMINGTON. I would like to rephrase the question because I think the people would like to know how you feel. Is there any chance now, based on the way we are manipulating our defenses, for this country to defend itself and its many allies without going to all-out war, to defend successfully itself and its allies in conventional war, in your opinion?

General GAVIN. There certainly better be, because the issue may not be all-out war.

Senator SYMINGTON. I agree with that, but my question still stands. Is there any way, based on the figures you have given of Russian strength vis-a-vis our strength, that this country can defend itself or its allies, unless it goes to all-out war?

General GAVIN. I would say, yes, there is. You are touching upon a very interesting point there, but I would say, yes, there is; yes.

Senator SYMINGTON. And would you describe the reasons for your belief?

WE WOULD LEAN HEAVILY ON OUR ALLIES

General GAVIN. Our policy, of course, is one of coalition, and we do depend on our allies. We have some 200—the equivalent at least of 200 divisions are the recipients of our military aid, and we must rely upon them for a great deal of support, and we do; and we check

carefully their level of training and their use of resources given to them.

We also have a tremendous amount of resources of our own in our reserves, and I think we must count upon calling up all of our power as rapidly as we can to meet the situations as they develop, counting upon the forces we have overseas to give us the initial cover, and working with our allies until we can apply all the power we have. I can see where this can be worked out.

Senator SYMINGTON. If you would like me to rephrase the question so that it would be clearer later on, I would be glad to change the record also, accordingly.

General GAVIN. No, sir; I understand it. It is quite all right now.

Senator SYMINGTON. Thank you, General.

In 1956 you testified that the Army was receiving insufficient funds for research and development. Yet after your testimony to that end the budget which was sent to the Congress for research and development for the Army was \$10 million less for the fiscal year 1958 than for the fiscal year 1957. Apparently they didn't agree with your testimony.

General GAVIN. That's right, sir.

Senator SYMINGTON. Has that affected the modernization of the Army?

General GAVIN. Yes; it has.

Senator SYMINGTON. In what fields? I suppose based on your previous testimony, in all fields except the Jupiter?

General GAVIN. That's right. Just about in all fields except the Jupiter, we have slipped steadily in all missile programs, for example.

Senator SYMINGTON. And even after October 4, which Dr. Teller called our technological Pearl Harbor, there not only hasn't been any acceleration of the Army program; there has been no replacement of those cuts, even in research and development, is that correct?

General GAVIN. That is correct. However, the consideration being given to the next year's budget I presume will reflect some concern.

Senator SYMINGTON. You mean you believe that—

General GAVIN. There will be more money.

Senator SYMINGTON. You will be able to get more money for research?

General GAVIN. Yes; I believe so.

Senator SYMINGTON. That is what you thought a year ago about the 1958 budget, wasn't it?

General GAVIN. That's right. I didn't get it. That's right.

Senator SYMINGTON. Actually, was it asked for beyond the Department of Defense? Did the Department of Defense ask for more money?

General GAVIN. In my particular budget; no, sir. Mine got to the Department of Defense and no farther.

DOING WELL WITH WHAT THEY HAVE GOT

Senator SYMINGTON. What did you get in research and development last year?

General GAVIN. Last year?

Senator SYMINGTON. Yes.

General GAVIN. I defended \$372 million and we had quite a tussle over \$8 million, but then it turned out I got \$355 million.

Senator SYMINGTON. There is another subject we have discussed, and that is the question of airlift. You, perhaps more than any other officer, are dedicated to the theory of mobility in ground forces. That is correct, is it not?

General GAVIN. That is correct, sir.

Senator SYMINGTON. And the testimony that you gave last year was that the Army would have great difficulty in handling a single division overseas. Of course, we were talking about lifting and properly supporting a division overseas. Has there been any change in that position?

General GAVIN. Well, there certainly has been some, but not a significant change. No large aircraft have come into the inventory in any number.

Senator SYMINGTON. Actually, you can't lift and properly lift a single division overseas, can you?

General GAVIN. I would say it would be marginal, and perhaps this should be looked into more carefully.

Senator SYMINGTON. With all the problems around in the Middle East and the Far East, and Germany, doesn't that mean that in effect our Army is not mobile.

General GAVIN. Yes; it is far from being as mobile as it should be; far from it.

Senator SYMINGTON. Yet there has been nothing whatever done about that, has there?

General GAVIN. I was sorry to see the contract for the C-132 canceled.

Senator SYMINGTON. And there were no orders in the fiscal year 1958 budget for the 133?

General GAVIN. I am not sure about that, sir. I was checking on that recently, and I think there are six in the inventory now. I am not sure of the figures.

Senator SYMINGTON. And the C-130 is really nothing more or less than a further development of the 119, is it not? It is a tactical plane?

General GAVIN. It is a tactical plane; that is correct, sir.

Senator SYMINGTON. So what you are saying is that despite the 83 commitments, or 120 we have all over the world, plus all the talk about the problems in Turkey and the Suez, and Syria and Germany and Japan and Indonesia and Indochina, Formosa, and Korea, and despite the fact if we had a conventional war we would naturally want to move our troops as fast as possible, not only can we not lift and properly support a single division overseas, but we have eliminated completely any further research and development in the strategic-airlift field. Is that not a statement of fact?

General GAVIN. Well, the elimination of further research and development—I am not sure about that, sir. The Air Force may be doing something of which I am unaware.

Senator SYMINGTON. But if they are doing anything, you are unaware of it?

AIRLIFT REQUIREMENT EXISTS FOR MISSILES TOO

General GAVIN. I am unaware of it. I would like to add to that too, another aspect of it that now concerns me very much, and that is that

all missiles in my opinion should be air mobile, and all fissionable material likewise.

It suggests an economical use of resources so you do not have huge stockpiles of fissionable material, and from the viewpoint of missiles they are very sensitive to obsolescence. They need rapid handling, and I would say they should all move by air. So the airlift requirement exists, as I expressed it to the committee, of which you were chairman, some time ago, and in fact, it has become more acute.

Senator SYMINGTON. Back about 11 years ago Secretary of War Patterson issued a directive that all equipment should be studied from the standpoint of its capability of being airlifted. Is there anything like that going on in the development of material, of equipment in the Army?

General GAVIN. Yes, there is, I would say. We are making a real effort, and it is evident in some of the equipment now coming up, such as the mechanical mule the M-56 and the creation of the 101st Airborne Division as an experimental division in this area. We are working very hard on that, sir.

Senator SYMINGTON. Getting back once more to the question of research and development and/or procurement, the C-132, the most advanced strategic airlift plane has been dropped, has it not?

General GAVIN. That is correct.

Senator SYMINGTON. And no C-133's were in the fiscal year 1958 budget. Is that correct?

General GAVIN. I am not sure about that.

Senator SYMINGTON. I believe I am sure of that.

General GAVIN. Yes.

Senator SYMINGTON. How about the fiscal year 1959? Do you know if any are in there?

General GAVIN. I do not know; nor would I be in a position to know at this time.

Senator SYMINGTON. A final question or two. Have you submitted your fiscal year 1959 research-and-development figures yet?

General GAVIN. Yes, sir; I have.

Senator SYMINGTON. Have you had any guidelines or feelings placed on what you were supposed to submit from the standpoint of getting the modern army you think we need?

General GAVIN. Well, the guidance which I received was quite clear, and it limits the amount, let us say, that I may request. However, there is still considerable discussion about the budget, and I may have an opportunity to ask for additional funds.

Senator SYMINGTON. Are you saying that, in spite of sputnik, in spite of the sharp recognition now, realization on our part of Russian progress, that your research-and-development funds are again going to be limited by fiscal considerations?

General GAVIN. I would not say that this is entirely so, sir.

HE EXPECTS INCREASED FUNDS FOR R. AND D.

Senator SYMINGTON. Please give the record, because we want the facts.

General GAVIN. No. I have been called into conference by Dr. Killian and the Department of Defense and there are indications that I am going to get more money in 1959 than I have been given in the past.

Senator SYMINGTON. Mr. Chairman, I have no further questions, and congratulate General Gavin on as fine an appearance as I have heard since I have been in the Senate.

Senator STENNIS. That is very fine. I would like to join the Senator in his congratulatory remarks, too.

Senator MUNDT, may we say again, sir, that we are very glad to have you here. You are a familiar character in this hall as well as others on the Hill. You are a very valuable member of our committees. Do you have some questions you would like to ask?

Senator MUNDT. I might ask one. I don't know whether the general can answer it or not.

Sitting as a member of the Appropriations Committee, eventually we will have to wrestle with these problems which are being discussed. Recognizing that in the last Congress our committee did make available more money than the House was willing to support, and we may have to do it again, if you are in a position to translate into dollars your recommendations, could you give some indication of what this means in terms of an appropriation, if you could write the ticket yourself? I would be glad to hear it.

General GAVIN. For research and development alone?

Senator MUNDT. Yes, that would be in comparison I think with the 372 request of a year ago.

General GAVIN. Yes. Well, as a matter of fact, my request which I have testified before the Appropriations Committee of the Senate last year, was \$596 million, and the current state of affairs is such that it would be significantly greater than that. So it is somewhat double what I got last year.

Senator MUNDT. Your request would be somewhat double, or double the 372?

General GAVIN. Double the \$372 million, roughly. That is in order of magnitude too.

Senator MUNDT. Roughly in the neighborhood of \$700 million?

General Gavin. That's right, sir.

NO SUGGESTIONS FOR SAVINGS

Senator MUNDT. I ask you this, General. We hear considerable discussions from our constituents who are greatly concerned about the international situation and the defense problems, and who also have an understandable concern about the fiscal state of the country, as to whether or not as the Army spends additional money and the Defense Department spends additional money for these new type weapons, which, of course, is essential, are there any economies which you might suggest that we might save in the Defense Department, from less emphasis, perhaps, on old type weapons and old type organizational procedures?

Are there economies that we might effectuate as we move into the new type areas and abandon, put less emphasis and less expenditures on the older type defense establishment?

General GAVIN. Well, sir, obviously, it would be nice to say, yes, I can cite specific things, but I must say I am not in a position to. We have been suffering from a degree of malnutrition for some time.

I don't know of any specific eliminations that I could put on the line now. I really don't.

Senator MUNDT. In your work, planning, I suppose you do re-evaluate all of these older type weapons, try to determine whether we have to pull those along with the newer type or whether they can be abandoned, and perhaps new emphasis be spent on the newer type weapons?

General GAVIN. We are going after the newer weapons just as fast as we can, and we will really eliminate where we can. There is not a great deal to eliminate, as I see it.

We are cutting out of our projected inventory, for example, significant quantities of artillery, Army artillery, Corps artillery, and the like of that.

Unfortunately, missiles cost more than they do.

Senator MUNDT. I am sure that is right.

I was wondering this. Frequently I am asked this question: Whether, as we go into unmanned missile field, which we certainly have to get into——

General GAVIN. Yes.

SUPPORTING FORCES WILL HAVE TO BE LARGER

Senator MUNDT. Because it means that in the overall we are going to have more men in the Army, for example, or less men in the Army?

General GAVIN. More men.

Senator MUNDT. More men?

General GAVIN. Absolutely.

Senator MUNDT. In other words, even though the missiles are unmanned, the supporting forces will have to be so large?

General GAVIN. Yes.

I believe all services have come to this conclusion. These missiles are very complex, and the missile is but a very small part of the complete system.

Consoles of computers, associated radars, electronics gear, tracking, fueling systems, fuel trailers, survey equipment, ordinary ground communications equipment—all of the things that go to make possible effective employment of missiles add up to manpower qualitatively and quantitatively superior to that which we have known in the past.

Senator MUNDT. Thank you, Mr. Chairman. I appreciate this opportunity.

I will be talking with the general again, I know, across the Appropriations Committee table.

Senator JOHNSON. Thank you, Senator Mundt. We are delighted to have had you with us, and we want to welcome you to all meetings of this committee.

Any other questions, Senator Stennis?

Senator Stennis. No questions.

Senator JOHNSON. Senator Symington?

Senator SYMINGTON. No, thank you, Mr. Chairman.

Senator JOHNSON. Counsel?

Mr. WEISL. I just want to join in my admiration for General Gavin.

Senator JOHNSON. General, did you read General Doolittle's testimony before this committee?

General GAVIN. I read it, but not with too much care. I went through it; yes, sir.

Senator JOHNSON. You saw his recommendations concerning the General Staff?

General GAVIN. Yes; I noticed that.

Senator JOHNSON. Do you find yourself in general agreement with him?

General GAVIN. Yes, I was. He was not specific.

Senator JOHNSON. I know.

As I gathered, he would retain the Joint Chiefs, and you would not; is that the general difference between you?

General GAVIN. Yes.

You understand, this is not in any way being critical of the Joint Chiefs. I would put the Joint Chiefs' competence up on the DOD staff, you see.

Senator JOHNSON. I didn't get that.

General GAVIN. I would put the Joint Chiefs' competence, that is, the Joint Intelligence Committee, Joint Logistics Committee, I would put that right under DOD, as part of his staff, and perhaps have the Chiefs remain as the senior military advisory group to the Secretary.

PLAN VERY CLOSE TO GENERAL DOOLITTLE'S

Senator JOHNSON. That would be somewhat the same plan General Doolittle outlined.

General GAVIN. Yes, it would be very close to it.

Senator JOHNSON. So both of you, in effect, are recommending the same thing?

General GAVIN. Essentially; and I arrived at mine quite independent of his. I wasn't aware of his.

Senator JOHNSON. General, you have been stimulating, refreshing, and inspiring.

It is a good time for the committee to take a recess until 10 o'clock tomorrow.

(Whereupon, at 9 p. m., the subcommittee recessed, to reconvene at 10 a. m., Saturday, December 14, 1957.)

INQUIRY INTO SATELLITE AND MISSILE PROGRAMS

SATURDAY, DECEMBER 14, 1957

UNITED STATES SENATE,
PREPAREDNESS INVESTIGATING SUBCOMMITTEE,
OF THE COMMITTEE ON ARMED SERVICES,
Washington, D. C.

The subcommittee met, pursuant to recess, at 10 a. m., in room 318, Senate Office Building, Senator Lyndon B. Johnson (chairman of the subcommittee), presiding.

Present: Senators Johnson (Texas), presiding, Stennis, Symington, Saltonstall, and Flanders. Senator Bush, member of the Committee on Armed Services.

Also present: Senator Carl Hayden (Arizona).

Edwin L. Weisl, chief counsel; Cyrus R. Vance, counsel; Gerald Siegel, associate counsel; Solis Horwitz, associate counsel; Daniel F. McGillicuddy, associate counsel; Stuart P. French, associate counsel; Dr. William Houston, consultant; and Dr. Edward C. Welsh, staff adviser.

Senator JOHNSON. The committee will come to order.

Before calling the first witness, I would like to express the gratitude of the committee to the scientists and the manufacturers who have been so frank and candid in their statements to us.

This is truly a time for frankness and candor. Nothing but the truth and the exact truth will serve the country in this time of peril. There are other scientists and manufacturers whom this committee has contacted or will contact. We have full and absolute confidence that they will respond in the same spirit because this committee needs information and the country needs information if it is to act intelligently and survive. The people who give that information must not be shackled. This committee intends, on its part, to see that that does not happen.

Events are moving rapidly. The newspapers this morning tell us that another country, Great Britain, may have solved the problem of controlling the energy of hydrogen. Science is advancing on a broad and rapid front. No nation has a monopoly on the creative genius necessary to advance civilization. Each nation has much to contribute toward that end. It becomes increasingly apparent that great advances which must be made come about only through hard work and through cooperation.

Our hearings today resume with further testimony from Army personnel.

Our first witness is another distinguished combat officer, Maj. Gen. John Bruce Medaris, who is commander of the Army Ballistic Missiles Agency.

General Medaris has had extensive experience both in and out of the military service, and he has commanded the Army Ballistic Missile Agency since November of 1955.

During the past 2 years our witness has been completely absorbed in the development of ballistic missiles at the United States Army Arsenal at Huntsville, Ala.

I am confident that he will contribute much detailed information about our missile program.

General Medaris is present, and if he will come to the stand, I will now administer the oath.

General Medaris, do you swear that the testimony you will give this committee will be the truth and nothing but the truth?

General MEDARIS. I do.

Senator JOHNSON. Be seated.

Counsel, will you proceed with the examination?

Mr. WEISL. Mr. Vance will examine General Medaris, Mr. Chairman.

Senator JOHNSON. Mr. Cyrus Vance, the associate counsel, will you proceed with the examination of the general.

(Biographical sketch of General Medaris is as follows:)

Maj. Gen. J. B. Medaris is commander of the Army Ballistic Missile Agency. His responsibilities include the development and establishment of the Redstone and intermediate-range ballistic missiles as weapons systems for the United States Army.

Born in Milford, Ohio, on May 12, 1902, he enlisted in the United States Marine Corps in 1918 and served in France during World War I.

In 1921, he was commissioned as a lieutenant of infantry and served with the 29th and 33d Infantry Regiments until detailed in the Ordnance Corps in 1926.

In October 1927, he resigned from the Army and for 10 years engaged in merchandising and management advisory activities in the business world.

In July 1939 he returned to active service and served successively until 1942 as executive officer, Cincinnati Ordnance District; assistant, district control office, Office Chief of Ordnance; executive, Contract Distribution Section, Office of the Under Secretary of War (with Secretary Patterson.)

In spring of 1942, he took to the field and was successively battalion commander; ordnance officer, II Corps—campaign in Tunisia, invasion of Sicily and Sicilian campaign.

Later he transferred to England as ordnance officer for the First Army and planned and executed ordnance portion of First Army's invasion of Normandy, remaining as ordnance officer for that Army's campaign in Europe.

After V-E Day, he served in turn as ordnance officer, Fifth Service Command; ordnance officer, Army Ground Forces; Chief, United States Army Mission to Argentina from 1949 to 1952.

Returning in June 1952, he became executive and Assistant Chief, Ammunition Branch, Industrial Division, and in May 1953 he became Chief of the Ammunition Branch, which position he held until his assignment as Assistant Chief of Ordnance and Chief of the Industrial Division of the Office, Chief of Ordnance, in November 1953.

He was promoted to the rank of major general on September 15, 1955.

In November 1955, he was designated as commanding general of the Army Ballistic Missile Agency.

Among the decorations he has been awarded are the Distinguished Service Medal (for the European invasion and the campaign following), the Legion of Merit, Bronze Star Medal, Soldier's Medal, and the French Legion of Honor.

TESTIMONY OF MAJ. GEN. JOHN B. MEDARIS, COMMANDER OF THE ARMY BALLISTIC MISSILE AGENCY

Mr. VANCE. General Medaris, you are the commander of the Army Ballistic Missile Agency, are you not?

General MEDARIS. That is correct.

Mr. VANCE. Would you tell us what the Army Ballistic Agency is?

General MEDARIS. The Army Ballistic Missile Agency is a tightly organized organization at the Redstone Arsenal in Huntsville, Ala., which has as its mission the development, production, and preparation for fielding of major ballistic missiles assigned to the Army as their responsibility, all of those over approximately 75 miles of range.

Mr. VANCE. Would you please give us a brief summary of your activities in ABMA?

General MEDARIS. The present activities of ABMA are primarily in two fields together with a great deal of forward planning.

In the 2 fields, I should say 3 now, of major activity, we are in the process of fielding the Redstone missile for the Army. We have the first of the combat groups that is to take the Redstone missile to the field. We have them in training and their equipment and the missiles to go with them are ready and they will shortly be deployed.

We have of course to supervise the production of the Redstone missile as a continuing objective, and its support in terms of maintenance and supply.

In addition to that, and the first priority mission of the agency at the present moment, is the completion of development and production of the Jupiter missile, the 1,500-mile missile together with its supporting equipment.

We also have a mission at the present time to launch a satellite, and we are engaged in those three activities primarily as continuing operations at the moment.

In addition to that of course we do a great deal of forward planning and forward engineering.

HISTORY OF ARMY'S DEVELOPMENT OF BALLISTIC MISSILES

Mr. VANCE. General, would you sketch briefly the history of the Army's development of ballistic missiles?

General MEDARIS. To take the whole Army development of ballistic missiles we have to go back quite a while.

The Army's interest in the missile field of course dates back to before and during World War II.

We took a great interest in the developments that were coming out against us, shall we say. I happen to have been in the target area of the first V-2 that was dropped, and so I remember this quite vividly. But at the close of the war the Army was responsible for bringing to this country a considerable group of the topnotch German scientists who had been responsible for the development and fielding of the German V-2.

They were taken to White Sands Proving Ground as a headquarters, and there began the initial operation to fire some of the V-2's that were captured to get more information about them.

It is appropriate here to say that the V-2 development when it was carried on in Germany was on such a crash basis that they did

not have much opportunity to find out why some of the things worked or why some of them did not work, and so at the first opportunity we wanted to fire a group of captured V-2's and bring the information up to date and get more information from them as to what the weak points were.

During this early period this group were also consultants to various segments of American industry that were interested in having a beginning in this field. Primarily this represented the present Rocketdyne division of North American Aviation. It wanted to begin on the rocket-engine business. General Electric was also an interested company at that time. And to both of these groups, as they began to get into these programs, this segment of German scientists were consultants.

During that period the research work in the upper atmosphere was carried on with such composite programs as the WAC Bumper or Bumper WAC, the WAC Corporal, and out of the development of the WAC Corporal grew the present Corporal missile, which is a ballistic missile. This was the first truly ballistic missile that was developed and fielded under Army sponsorship, and this was done primarily with the Jet Propulsion Laboratory of the California Institute of Technology.

Around 1950 it became obvious that the efforts of the Army required enlarged resources in terms of missiles in general, not only ballistic missiles but tactical missiles, antiaircraft missiles, and so forth. And at that time the present Redstone Arsenal site was selected as the base for all Army activities in the development and production of missiles.

The group headed by Dr. von Braun was moved there and resources began to be put together, at that time devoted to the Redstone program.

So from the Corporal and——

Senator JOHNSON. What was that date?

General MEDARIS. This is approximately 1950. I can look the exact date up.

Senator JOHNSON. That is all right.

General MEDARIS. It was April 15, 1950. At that time the Redstone program was moving along on a developmental basis. It went through several changes of orientation, largely due to certain uncertainties in the area of the nuclear weapons, in that it was difficult to forecast exactly what weights were required at that time for the nuclear weapons. And since the ballistic missiles all depend for their design on the payload that they have to carry, this became somewhat of a problem, and it was not until, finally, I believe, 1954 that the Redstone missile was launched purposely on its way, directed to its present destiny.

The Redstone missile was equipped with a rocket engine that had grown out of the work at North American Aviation, and it was in fact initially a refinement, improvement, of the V-2 engine. It has gone through a great deal of refinement since and is now very dependable, probably the most dependable rocket engine that we have.

The Redstone missile system was the focus of development in the ballistic missile field from 1954 until 1955, late 1955, at which time the Army launched into the development of Jupiter. There are a great many intervening dates with respect to recommendations and desires. It is interesting to note that the Redstone missile initially

was expected to be a missile of about 465 miles range. And due to the weight of the warhead that was contemplated, it was reorientated to its present range of 200 miles, because at that time it was deemed by the missile authorities of the Department of Defense that it would be easier, more practical to come out with it at its present range with that gross weight of warhead than to go for the 465-mile range.

For one reason or another we have not since had the opportunity to go for 465 miles.

Senator JOHNSON. Senator Saltonstall.

Senator SALTONSTALL. Would the counsel be willing to ask the general to elaborate a little further about the heavier warhead, how that was worked out and why it was worked out?

Mr. VANCE. General Medaris, you heard Senator Saltonstall's question. Would you please elaborate?

General MEDARIS. This is a rather difficult question to discuss in detail, gentlemen, in open session. It is a question of what was deemed to be the required yield for a heavy ballistic missile, and the forecasts at that time from the Atomic Energy Commission and their people as to within what weights these yields could be achieved. Now, of course, the progress since that time has been much more rapid, and it has turned out that the then predicted yields could be had with much lighter weights today. But at that time it was deemed that the heavy warhead of 3-plus tons was the essential for the performance that was deemed appropriate for this weapon.

As to those yields and so forth, of course, I would not discuss that in open meeting.

Mr. VANCE. Senator Saltonstall, is that satisfactory?

Please continue.

General MEDARIS. Generally speaking, in summary then the Army has been deeply in the ballistic missile field since the close of the war. It has attempted to cover the spectrum of weapons in that field. For one reason or another we have only part of the spectrum presently covered. As early as 1950, we were trying to go for approximately 500 miles range for the Redstone, and that portion of the spectrum is still uncovered.

Mr. Vance. General, would you tell us as much as you can consonant with national security about the Jupiter missile?

General MEDARIS. The Army back around 1954, I believe, knew that it could go for a 1,500-mile missile, and at that time I believe General Gavin made representations to the Chief of Staff that we should go out for it. However, the financial situation did not permit; the Army's resources were insufficient to go for it on a full basis. I don't know that it ever came to a question of whether we could or could not from the standpoint of authority, but at least the resources were not there to do so and it was determined that we would move on in a very orderly fashion through the Redstone into greater ranges.

Mr. VANCE. Might I interrupt for a minute. Was such a recommendation made to your knowledge?

General MEDARIS. This was in the Army. A recommendation was made to the then Chief of Staff of the Army but it was realized that the resources were insufficient to go on. I do not believe the recommendation ever got beyond the Army, although I cannot say that for certain. General Gavin would have to elaborate that point.

Mr. VANCE. All right.

General MEDARIS. Then in 1955, a specific recommendation was made after the Killian committee had determined that an intermediate-range missile was essential to the national security, a completely engineered proposal for a 1,500-mile missile was submitted, and culminated in late October of 1955 in the determination of the Secretary of Defense that the Army should proceed to develop a 1,500-mile missile for both sea-based and land-based use.

Its primary requirement at that time was to meet the needs of the Navy for a sea-based 1,500-mile missile and, as a second mission, so to speak, it was to be land based also.

Of course, these are completely compatible because obviously if you can satisfy the sea-based requirements, the land-based one is easy, as the sea-based missile would serve.

ARMY BALLISTIC MISSILE AGENCY ORGANIZED

It was at this time the agency I now command was inaugurated to give substance and force to the program, and it was separated from the balance of the missile program of the Army because of its unique situation.

It has an in-house capability to do prototype development and prototype tests and carry through to actual production of the missile; whereas in the balance of the missile work it is done by industry.

Mr. VANCE. What do you mean by "in-house capability"?

General MEDARIS. I mean in the Ballistic Missile Agency, with all the scientists we have, we can do the experimental, initial experimental and theoretical calculation, the construction and assembly of the early hardware, the prototype hardware, finally the flight testing of the missile, which is done at the Air Force missile test center in Florida, but under our own firing crew who are part of our laboratories, and finally we can produce in limited quantities those missiles, as we did initially for the Redstone. It (Redstone) was then phased over to industry when the engineering development was complete.

What I mean by an in-house capability, this can be done by our own close group in one place, all of whom are Government employees.

Mr. VANCE. Please continue.

General MEDARIS. Then this project was launched formally and very forcefully at this time, and this was late 1955. The agency actually took its official form on February 1, 1956, although I was named as the commander designate in October of 1955; and had the supervision of the program from that time on.

We continued with primary emphasis on the Navy's requirement, which involved some rather tough problems which we were able to solve; and coincidentally we continued the engineering necessary to assure that the missile would meet the land mobile requirement as well as the sea requirement.

In the summer of 1956, the Navy decided, for its own proper reasons, that it could afford better the delay consequent upon going for a much further advanced atomic warhead, plus a much further advanced solid propellant missile, in order to accommodate them aboard submarines, and they decided as a matter of resources that the continuation of both programs coincidentally was not in their interest due to ship costs. In order to accomplish the result and make it effective, they decided to drop out of the Jupiter program and focus all of their energies on what

is now the Polaris program, recognizing when they did so that they were facing a considerably greater delay in being able to field a weapon, but feeling this was highly justified in view of their urgent requirement for that type of missile.

Senator SALTONSTALL. What was that date?

General MEDARIS. Of course, this occurred over a period of months in the middle of 1956. We will look up here the exact date of the final directive which severed the Navy interest in the program.

Following that, we continued with the development of the Jupiter as a land-based weapon only.

The final confirmation of the Navy's complete dropout was as of December 10, 1956, but it was a known fact in the fall, in early fall, that the Polaris program was underway.

Following that, we continued with the development of the Jupiter on what we believed and believe today to be the optimum time scale for an effective weapon, developing it for land-based use, based on a mobile concept, which we had found to be highly practical with the Redstone missile.

In late November of 1956, as you gentlemen remember, the decision was finally made as to who was to employ the weapon. Before that time, it had been an open development problem without final decision as to who was to have the employment; and in late 1956, the Secretary of Defense issued a memorandum in which he charged the operational aspects of the intermediate range ballistic missile to the Air Force.

This put us in the position, of course, where we were then to develop a weapon which, if and when used, would be used by the Air Force, and from that time on we continued our efforts trying to find out as much as we could about the Air Force intended method of deployment, and trying to orient the development of it in such a way that it would be acceptable to them.

But we did not slacken our efforts in any respect. There was no decision, during any of that time, to discontinue the development of Jupiter, although it would appear psychologically to have been threatened several times, and we so felt.

However, we continued without letup. We fired the first Jupiter test missiles in their proper configuration some 2 months prior to the date that we had predicted, in December of 1955, that we would fire them, and we continued with our program ahead of schedule to the present time. Every missile in the Jupiter missile up to date has been fired on or ahead of the date predicted in 1955.

Mr. VANCE. General, just a second. You said they were fired in proper configuration. What do you mean by that?

General MEDARIS. I mean we had other test missiles which carried other Jupiter names, like Jupiter-A and Jupiter-C, which carried those names simply because they were supporting elements of the Jupiter program. And when I say the proper configuration, I mean the Jupiter itself in the configuration which would carry the Jupiter warhead and would successfully perform its mission.

Mr. VANCE. Thank you. Please continue.

General MEDARIS. There were many other problems. It is a long story, of course, and if I go into too much detail, please let me know.

Mr. VANCE. Go right ahead.

General MEDARIS. But to relate other facts that go along with it.

Early or in the middle of 1955, the Army, the same organization, had also been involved with, jointly with, the Navy in the question of a possible scientific satellite, and under the term "Project Orbiter," had put in a proposal for launching such instrumented satellites of approximately 19 pounds instrumented weight.

Mr. VANCE. When was that proposal made, General?

General MEDARIS. That proposal was made in the early fall of 1955, the first proposal on Orbiter. I will have the date for you in just a moment, Mr. Vance.

It must have been a little earlier than that. We will get the date before this, because it was in August 1955 that the committee that had been appointed to determine what was to be done in the satellite field for the IGY determined that the Vanguard project was to be used instead, and stopped the work, canceled out the Orbiter.

Mr. VANCE. What committee was that, General?

General MEDARIS. This was the so-called Stewart committee. It was a committee appointed as a panel, I believe, of the National Research Foundation, and operating, however, within the framework of the Defense Department, made its recommendations to the Department of Defense, and the decision emanated from the Department of Defense to terminate Orbiter and go into Vanguard.

I had better fill in these dates a little bit more accurately for my chronology. It was on the 15th of September 1954, that the first report on the practicality of a satellite was issued by Dr. von Braun's group, and this was proposed to be done on the basis of components that were available to the Ordnance Corps.

And on the 14th of December, 1954, a memorandum was directed to the Navy with respect to this capability, and it was as a result of that memorandum that the two got together, the Navy and the Army, on the question of Project Orbiter, and that name was used at that time.

PROJECT ORBITER DROPPED

Then, there was a presentation to the Army Policy Council on August 3, 1955, and the schedule of the Orbiter was turned out at that time. They were told what could be done. And in August of 1955, the Homer J. Stewart—the ad hoc committee on special capabilities was the title of it, made a report in which they approved the Vanguard project, and as a result of that report, Project Orbiter was stopped.

Senator SALTONSTALL. Which was stopped?

General MEDARIS. The project then called Project Orbiter, which was the original Army-Navy proposal, the proposal based on Dr. von Braun's project for a scientific satellite. It was then called Project Orbiter.

Mr. VANCE. And that project contemplated using the Jupiter missile?

General MEDARIS. No; that project contemplated using what is now known as the Jupiter-C missile, which, as I mentioned before—to keep out of confusion, let's get these straight. The Jupiter-C missile is not a Jupiter at all, but it is named Jupiter-C because of the fact that the missions that it has had have been missions in the Jupiter program. And therefore, we keep the names related, with sub-numbers, in order that they are submitted in the project papers all together.

And this Project Orbiter contemplated the use of the Redstone as the booster missile, with upper stages of solid propellants in essentially the form that is now Jupiter-C.

I relate this in connection with the Jupiter program because the outgrowth of this Project Orbiter became the reentry test vehicle for the Jupiter program, and when the Jupiter program was assigned in late 1955, one of the problems that we knew had to be solved was the problem of reentry.

Now, there are many more problems involved in that field than just the question of getting through the heat barrier. There are ways of getting through the heat barrier, as there are ways of doing anything else. There are ways to do it by brute force, and there are ways to do it with finesse.

The problem is to get through it efficiently, to have the proper protection for your components, to do it with minimum weight, and at the same time to disturb the accuracy of the inbound missile the least possible amount.

You can vary all these factors together, and find many solutions. If you want to accept a greater inaccuracy, a greater drift on the down dive, you can reduce the heat input and therefore the problem becomes easier.

If you want to use more weight, the problem becomes easier. This is a problem of getting the most efficient head with the least weight; and in order to solve that problem it was the recommendation of Dr. von Braun, and with my approval, that we use the same test vehicle that had already been engineered and designed for Project Orbiter, and by eliminating the fourth stage we could then put a scale model of such type that the heat effects would be the same, exactly, as they would be on the final Jupiter head; we could put a scale model through a flight condition that would duplicate those reentry problems, and it was believed that we could recover it, that it could have a proper gear inside by which it could be recovered. And the physical recovery of such a head we believe to be highly important.

This relates primarily to the problem of weight, because by physical recovery you determine exactly how much of your protection material has been used, and this, in turn, permits you to reduce the weight to the absolute minimum, because you can cut off everything except what you needed for that protection and leave only a paper-thin covering below it, and you are all right.

But if you can't determine exactly how much has been used under these conditions, you must allow a safety factor, and that adds more weight.

So we then took this Project Orbiter and turned it into Jupiter-C, intended for this purpose.

Now, the initial engineering, complete, of course, had been on the basis of launching a satellite, and it takes time to reengineer any element of a missile system. They are not independent; they have to be done all together, and they have to be done carefully. And so, in order to test the propulsion system and the principle of the liquid first stage and the solid upper stages, the first flight of a test missile of this type was in September of 1956.

And this was flown actually in the satellite configuration, although the fourth stage was not loaded, but the configuration was not changed because we had not had time to do the engineering, and still do it that early.

Meantime, we were engineering the changes necessary to put the protected, scaled down head aboard. This test was highly successful; because of the low weight of the projectile, so-called, in it, why, it flew some 3,000 miles instead of the 1,500 that would be the target for the final reentry test. It was a matter of weight entirely, and the same vehicle was used.

Following that we came up with two reentry flights in the reentry head configuration (or nose cone configuration) both intended for recovery. The first was not recovered. It landed outside of the area where recovery had been fully prepared. This was due to a deviation in direction when it finally took off with the last two stages. And although we knew it lived and came through and got into the water in good shape, nobody could get to it in time to recover it.

Actually, we believe the sharks got the balloon as a matter of fact because of a number of them we found around the second one when we got to that.

NOSE CONE EXHIBITED ON TV BY PRESIDENT

But somewhat later we came up with the second such flight, and this one was successful—fully successful. The nose cone was recovered and this was the nose cone, of course, that the President had on TV not long ago. This fully satisfied the conditions of the initial test for the reentry solution which we had believed would work in connection with the Jupiter program.

In view of the fact that we were shortly going to fly full-scale Jupiter nose cones with this reentry protection, we could see no further purpose in the reentry test program, so the balance of it was canceled and the hardware was put on the shelf. This hardware becomes the basis for the Army's present project in the satellite field. That hardware that was prepared for the reentry program now becomes the basis for launching the satellites which we have been directed to launch.

Another element of interest, I think, in connection with the Jupiter program has been the fact that having the Redstone missile on its way into deployment and production at that time, and having it in a very dependable flight stage, it became the means for test flying many of the components for the Jupiter system in advance.

For example, here is one component—the angle of attack meter which we used to provide stability in the rise phase to an unstable missile—were flown many times on Redstone missiles before we had Jupiter hardware to put them on. Now they are being flown on Jupiter, of course, but this gave us many months lead.

Since it is, the Jupiter is, in fact, a second generation missile based on the Redstone, we are still using some 70 percent in number of components based on those that were on Redstone.

I believe that brings the Jupiter program up to date, sir.

Mr. VANCE. With respect to the Jupiter program, what priority did that get when it was started in 1955?

General MEDARIS. When the Jupiter program was started in 1955, it shared the highest national priority with the Thor, the Atlas, and the Titan.

Mr. VANCE. What limitations or restrictions have been placed on the Jupiter program?

General MEDARIS. The primary limitation on the program, I think, has been one of uncertainty. It has been a psychological limitation

rather than a factual limitation. We have managed, I believe, to protect ourselves against it to the point where we certainly haven't lost anything on our time scale. And since our time scale and point of development today is up to or ahead of that which we predicted in 1955, I would not be in very good grace if I said there had been a great many obstacles put in the way of it.

However, there has been a psychological handicap because of the continuing uncertainty that has been present with respect to the ultimate destiny of the program.

Senator JOHNSON. Are you saying, General, that you made as much progress as you think was possible?

General MEDARIS. Mr. Chairman, we set the original program on the basis of what we considered to be an optimum development schedule. This leads into a development philosophy. It leads into the point where, in the considered judgment of the engineers, if you go faster you are simply spinning your wheels, if you go slower you are wasting time.

Our original development schedule was laid out on what we believed to be an optimum time scale, and I might say that when we ourselves are satisfied that the present designs we have can be released into production as a sound missile design, and when that decision on our part is only 2 years behind the initial project approval, I do not think you are going to beat that much with anything.

Senator JOHNSON. Now, answer my question very briefly so I can understand your answer. Could you have done a better job? Could you have gone faster, in your opinion, yes or no?

General MEDARIS. I doubt it.

Senator JOHNSON. Thank you.

Mr. VANCE. General, is it not a fact that a directive was issued in August of 1957 which limited production of Jupiter missiles and ground support equipment?

General MEDARIS. That is true, that is true. However, this limitation on the number of Jupiters that we could produce would have had an effective date a year or more after that, because of the fact that what you start at that point does not come out until that time in the future. And so up to this present moment that has had no restriction on the speed of the program.

Mr. VANCE. Will it in the future?

General MEDARIS. It may, although it will be very hard to tell, because of the fact that this only means the difference in how many test missiles we are flying at a time when we have already flown our prototype missile and are merely in the stage of product improvement and tests of reliability.

That is the first place that the numbers that we would be flying for development purposes would be affected by that directive. And at that point if we have been successful with everything up to there, we can hardly say that it will have affected it. However, you will never be able to know.

Mr. VANCE. Is it your testimony then that this restriction did not in the past and will not in the future restrict the development of the Jupiter missile?

General MEDARIS. I am not going to be quite that positive with it. I say that it did not in the past because we have not gotten to the time that would have been affected by it, and I also say that I do

not believe we can ever tell whether the future will have been affected by it or not.

Mr. VANCE. Did you protest or recommend against this restriction? General MEDARIS. Definitely.

Mr. VANCE. Why?

General MEDARIS. Because in my opinion the important element for any development program is a continuity of operation against a single set of guidelines without any restrictions that are either psychological, financial, or administrative. So I protest anything that gets in the way of moving a program as fast as we believe we can move it soundly, just as a matter of principle.

Mr. VANCE. Then why do you testify now that you do not believe that this has had or will have a restrictive effect on the program?

General MEDARIS. I am sorry, Mr. Vance, I did not say that I would testify that it will not have any restriction on it. I can say it has not had because the effect of that would not have been felt until next fall, the fall of 1958, and by that time it will be difficult to tell.

Now, as a matter of fact, when I say that there has been no restriction, I will mean it that way. If I say there has been, I expect to be able to support it with absolute fact; and in this case I cannot support the statement that this restriction has a delaying effect because its effect will not be known for another 9 months or so, and then will be difficult to determine.

Mr. VANCE. Then you have no opinion now?

General MEDARIS. At the present time I know that we have not allowed it to affect us up to now, and I believe if we are successful with everything we do in the next 6 months, which we expect to be, that it will have no definite effect on the final program. It did not last very long. If it had, it would have.

Mr. VANCE. How long did it last, General?

General MEDARIS. It lasted until—in the middle of September after the deliberations of the ad hoc committee in Washington—

AD HOC COMMITTEE EXAMINED INTO MERITS OF MISSILES

Mr. VANCE. What is the ad hoc committee?

General MEDARIS. The ad hoc committee was composed of Mr. Holaday, General Schriever of the Air Force and myself as the Army representative, and was to examine into the relative merits of the Jupiter and Thor and attempt to come up with a solution as to whether they could be married, and if not, which one should be canceled.

Mr. VANCE. That committee is also known as the Jupiter-Thor committee?

General MEDARIS. That is correct. After the deliberations of that committee, we were instructed to go ahead with the development of a complete missile system for Jupiter, and at that point the restriction on the numbers of missiles for development purposes was lifted, so that actually the restriction only lasted about 6 weeks.

Mr. VANCE. And the restriction was lifted as a result of your protest?

General MEDARIS. The restriction was lifted as a result of the deliberations of the committee, and obviously my very vociferous

statement at that time during the committee that we should be under no handicaps that were not equally laid on the Thor program.

Mr. VANCE. General, the same directive put a restriction on the use of overtime, did it not?

General MEDARIS. Not that same directive. The overtime restrictions—it was quoted in that directive but the overtime restrictions were—actually imposed separately, and they were in terms of, I believe, 3 percent on a program basis, which meant that across the board—contractors and in our own in-house operations—as a total we could use 3 percent of productive man-hours for overtime.

Mr. VANCE. When was the overtime restriction put into effect?

General MEDARIS. I never did put it into effect.

Mr. VANCE. I want to ask you about that in a minute.

General MEDARIS. This was August 13. There was a memorandum for the Secretary of the Army from the Secretary of Defense on the subject of the IRBM program dated the 13th of August.

Mr. VANCE. What year?

General MEDARIS. 1957, which gave this basis of 3 percent on a program basis across the board.

Mr. VANCE. General, you said that you never did put the overtime restriction into effect. Would you please amplify?

General MEDARIS. Yes, sir. The fact is that I immediately took a reclama from the position and cited the most extensive facts and figures as to the position that I was put in by having both a limitation on manpower which had been imposed on ABMA at a total of 4,100 and a limitation on overtime, and I merely stated the obvious fact that the two together simply put a total limit on effort.

Mr. VANCE. So in effect you recommended against and protested the overtime restrictions?

General MEDARIS. I did and the Army carried those protests on up to the Secretary of Defense, and the actions relieving that overtime came as an answer to that reclama and in the meantime as long as I have got an appeal in court I don't go to jail, so I did not stop the overtime.

Mr. VANCE. When were those restrictions lifted, General?

General MEDARIS. They were approximately coincidental.

Oh, yes, I remember that now. That was the last thing that Secretary Wilson did. The last day that he went out of office he announced that he had lifted all the overtime restrictions on ABMA.

I think we can find that date. It was approximately the first week in October. I think it was the eighth or ninth of October.

Mr. VANCE. Of what year, General?

General MEDARIS. 1957.

Mr. VANCE. And that overtime restriction, General, was it on development overtime or production overtime?

General MEDARIS. This was on both. This 3 percent was across the board on what is known as a program basis.

In other words, it applied to all activities under the Jupiter program.

Now there was an escape clause in it with respect to the activities of the firing units down at Cape Canaveral, in that we were allowed, I think the wording was that a reasonable amount in excess of that 3 percent when required to support unusual test operations and flight test schedules would be allowed.

Mr. VANCE. General, I wonder if you would submit for the record all documents relating to the restriction of overtime.

General MEDARIS. We will be glad to.

(Information requested of General Medaris is included in the classified records of the subcommittee.)

Mr. VANCE. General, was the restriction lifted after Sputnik I went up?

General MEDARIS. I believe it was about 4 days after Sputnik I went up; yes, sir.

Mr. VANCE. Was it completely lifted?

General MEDARIS. Yes.

Mr. VANCE. No percentage restrictions?

General MEDARIS. No percentage restriction was imposed.

It was taken off as a blanket—

Senator JOHNSON. In your opinion did sputnik have anything to do with it?

General MEDARIS. Mr. Chairman, I would hate to answer that question because it would be just—

Senator JOHNSON. That would be a very difficult question.

General MEDARIS. It would be just one man's guess. I don't know all the elements that entered into that decision.

We had put a great deal of pressure in the Army on the relief of this restriction prior to that time, and what the current events of that day had to do with it I would not want to guess.

Senator JOHNSON. You would say that you have had considerable more action in the Sputnik I and Sputnik II periods than you did before even with these pressures you were putting on to get these restrictions lifted?

General MEDARIS. Yes; I could say that very definitely.

Senator JOHNSON. Thank you very much. I appreciate your frankness.

UNCERTAINTY ABOUT JUPITER PROGRAM

Mr. VANCE. General, what bottlenecks were there with respect to the Jupiter program; or are there any now?

General MEDARIS. The primary bottleneck throughout the entire Jupiter program can hardly be called a bottleneck. It is more in the nature of an impediment, it has been that of uncertainty, it has been the fact that the program was under constant examination for possible cancellation.

We had lifetimes given to us that varied from 5 months at the beginning to as low as 45 days that we were looking forward to as the lifetime of the project possibly, and this has a very profound psychological effect naturally.

It was also this uncertainty which led to the fixing of the limit of personnel at the agency to 4,100, the view being that if the project were canceled, this would be the maximum number of people that we could devote to other purposes, and avoid having an unstable employment situation.

Mr. VANCE. May I interrupt a minute?

If there had not been that uncertainty, you would have been able to use more personnel and get ahead faster.

General MEDARIS. Oh, yes, sir, I would have had less overtime and I would have had more people on the payroll and therefore I would have had a reserve of effort to meet unknown contingencies.

Now as to the latter part that I could have done it faster, I could have done it more intelligently, but I don't think we could have done it any faster because we have kept our schedule by superhuman effort, but it has taken superhuman effort on the part of our people to do it.

Mr. VANCE. But could you have accelerated your schedule if you had more people?

General MEDARIS. I don't believe so. I still believe that the time basis of our schedule is the optimum for the development of a missile.

Mr. VANCE. Would you please continue with your description of the other bottlenecks which existed or still exist?

General MEDARIS. This and associated with it, short-time funding which of course does go along with an uncertainty of decision also has been in our way. It has not let us get the rolling momentum for the future that we wanted.

Now none of these have registered during the early portions of the development program. When they begin to take hold is when you should have your speed accelerating and generating a faster move out to production and deployment.

You should have all the actions underway that are going out there.

Mr. VANCE. So that these restrictions or bottlenecks may have an effect in the future?

General MEDARIS. They may. They may still have an effect, although they have now in large part been removed.

Mr. VANCE. What is your opinion? Will they?

General MEDARIS. In my opinion they will have some effect; yes. It won't be a great deal because again, as we always have, we bend every effort we can to make up for whatever handicaps or checks have been thrown into it, and we tire people out and wear them out but we get it done.

Mr. VANCE. Are there any other bottlenecks?

General MEDARIS. I think inherently in the whole process is the decision-time element, the time required to get decisions as definitive approvals or guidelines on which to proceed.

This was obvious in the early phases of the program because the first decision gave us a running start on a program and certain program approvals, but it has affected the availability of facilities for the use of my agency and my people down there, test facilities and laboratory facilities.

It has taken a great deal of time to get final decisions which could be accepted as guidelines. Again you cannot put a quantitative measure of time on this because we do our work in shacks until we get the proper thing to put it in.

How much time have we lost, I don't know.

Mr. VANCE. At what level was this lack of decision?

General MEDARIS. It is all outside the Army, I will tell you that.

Mr. VANCE. Then it was in the Defense Department?

General MEDARIS. They have the authority; yes, sir.

Mr. VANCE. Are there any other bottlenecks that have existed or still exist?

General MEDARIS. I think those are the primary ones.

I don't know of any others. Of course the Secretary of the Army has delegated to me every authority that he has the privilege by law to delegate, and so we have no local handicaps.

We have no handicap, in other words, in the use of our resources once those resources are approved to us, and our line of approach is approved.

Mr. VANCE. General, I would like to read to you from a telegram from Mr. Ernst Stuhlinger, which was received in response to questions sent to him by the staff of this committee, and then ask for your comments.

Mr. Stuhlinger says:

Decisive bottlenecks encountered during recent years of the Army Ballistic Missile Agency were caused rather by the lack of a clear-cut assignment of an IRBM or satellite project, by the uncertainty whether IRBM work could be carried on or discontinued soon, by the lack of manpower, funds, and assignment for supporting research.

Do you agree with that?

General MEDARIS. I agree definitely with these first two points, and I agree with some minor qualifications to his third.

Mr. VANCE. Would you please state your qualifications with respect to the third?

General MEDARIS. I have already discussed with you the effect of the manpower limitation, and while I recognize that it has been in the nature of a hammer over the heads of these people during this period, it has been overcome by the continued use of overtime and by other means, and I really believe that what Dr. Stuhlinger is talking about again is this question of the psychological holdback.

RESEARCH LIMITED TO DEFINITIVE PROGRAM

Now in the research area there is no question that there is a limit to our authority to engage in research activities beyond the definitive program in which we are engaged.

This is all the time and this is one of the basic problems in the whole business of getting on with the development of modern weapons, because it impedes the whole works.

How much it impedes ours alone I don't know.

Mr. VANCE. Do you feel that should be corrected?

General MEDARIS. I feel it has to be corrected, because if you wait until the time when you can envisage a final product to go ahead and break the barriers and develop all the pieces that go into that product, you are going to be late, and you are always going to be late; you will never get caught up on that basis.

Mr. VANCE. In your opinion, General, how should it be corrected?

THE WAY TO CORRECT THE SITUATION

General MEDARIS. Well, as soon as you can see your way to an advance in the state of the art or to an investigation into the possibility of an advance in the state of the art in any of the primary elements that contribute to advanced weapons systems, such as propulsion systems, guidance systems, nose-cone systems, new structural methods, and all that, it should be possible to go ahead and develop that particular item, break the bottlenecks, get into the question of what new scientific principles have to be worked out or what engineering developments are required, and get on with it, so that when you can see from the whole state of the art that you can have a new weapon, you have already got the advances made in the subordinate areas.

I give you as a key point the fact that one of the great holes in the ballistic-missile business today is that there is no big-thrust ballistic engine or rocket engine under development. There should have been as much as 2 or 3 years ago.

Mr. VANCE. Was that recommended, General?

General MEDARIS. It was.

Senator FLANDERS. Excuse me, Mr. Chairman.

I did not get that statement from the General, and I would like to have him repeat it.

General MEDARIS. Thank you, sir. The fact is that there is no high-thrust advanced big rocket engine under development today.

Senator FLANDERS. High what?

General MEDARIS. High thrust.

Senator FLANDERS. Thrust?

General MEDARIS. Yes, sir.

Mr. VANCE. And you said that you had recommended such a project?

General MEDARIS. Yes, sir. As a matter of fact, in the summer of 1956, there was a committee headed by Mr. Silverstein that was to look into the need of the Department of Defense for new engines. We made specific recommendations at that time that we be allowed to develop, and this was a very modest request but we felt we couldn't get away with any more, an engine of approximately 220,000 pounds thrust.

It turned out——

Senator JOHNSON. Do you regard the failure to act favorably on that decision as very much against our national interest?

General MEDARIS. I would rather put it in another way, Mr. Chairman. I don't even think that that recommendation was as forward-looking as it should be, should have been, but we felt that this was the most that we could possibly get away with, so we limited it to that.

The fact is that there is in the engineering stage at North American, but in the engineering stage, an engine of much higher thrust.

Senator JOHNSON. I just want to point out where all of us can understand it, whatever you tried to get away with which you thought was extremely modest, you did not get away with?

General MEDARIS. That is correct.

Senator JOHNSON. And the fact you did not get away with it resulted in certainly loss of prestige, if not in possible loss of life and limb?

General MEDARIS. It will impede future programs, let's put it that way. We cannot go along with future fields the way we should, because we won't have high thrust.

Senator JOHNSON. We want to lay it on the line here and let the country have the facts, and I find it is very difficult to get—to pinpoint these things and get them in shape where the country can understand them. And you did make a very modest recommendation, you tried to get away with it, and you did not. That is the net of what you are saying?

General MEDARIS. That is right, yes, sir.

May I try to clarify this thing a little bit more?

Senator JOHNSON. Thank you.

Mr. VANCE. Please do.

General MEDARIS. The fact is that the engines that are being developed today are those required for Jupiter, Thor, Atlas, and Titan. Beyond that, for some future use now unknown, there is no high-powered development project on a rocket engine.

There is one of substantially greater thrust that is in the engineering stage at North American at Rocketdyne, which should be being carried out on a crash basis; and instead of that it is coasting along on an engineering basis, the reason being that nobody can put down their finger today on the specific project for which they need that engine.

Now, this is what I mean by advancing the applied research in the various areas of tools that are needed for future weapons.

TURNED DOWN BECAUSE THEY COULDN'T PROVE ENGINE WAS NEEDED FOR JUPITER

The reason we were turned down on our modest request is that we couldn't prove we needed it for Jupiter, and as long as we couldn't prove we needed it for Jupiter, we couldn't get it.

This is one thing which has to be changed if we are going to make the progress in these fields that we should make, and that we can make, and that is, we have to get the pieces, the tools of the trade, out ahead of the actual final end product that we intend to put in use. We have got to develop engines and guidance systems, and those things, (even if we don't know what we are going to do with them today); because just as sure as they come through, by that time there will be plenty of use for them, and you have got to get down the road.

Senator JOHNSON. Is the kind of engine you recommended the same kind the Russians used in launching their 1,000-pound satellite?

General MEDARIS. I believe it is about the same caliber as the one they used in the first stage; that is my analysis from all the knowledge we have available.

Senator JOHNSON. So you would substitute a crash program for the coasting?

General MEDARIS. I certainly would.

Of course, I don't like to use the word "crash," because I think—

Senator JOHNSON. I gather you do not, but you are getting down now to where you are telling us now what we want to hear, what we want to know, what we have to do, what we have to face up to. And if you will just do that and put it on the record here, this committee will do something about it.

General MEDARIS. I am perfectly willing to go on the record on all of these, Mr. Chairman.

Senator JOHNSON. All right.

Go ahead, Counsel.

General MEDARIS. I only want to be sure I am understood and not misinterpreted. The reason I don't like the word "crash" is because the usual connotations of a crash program mean the scattering of a lot of money all over the country to do a lot of things because you don't know exactly what you do want to do.

Now, that kind of crash program I don't believe in. The kind of program I do believe in, and that I believe we should be doing, is the kind that has ahead of it all the time an objective that is way out of reach, that has enough money to keep rolling as fast as it can roll

with sound, commonsense and good scientific and engineering judgment behind it.

This is the kind of program I recommend, and I don't like to call it a crash program, because that usually means you get 6 people to do a job that 1 person can do.

Senator JOHNSON. The record will show that you used the word "crash." It is your word.

General MEDARIS. Very well, sir.

Senator JOHNSON. And let the record show you have defined it, given your definition of "crash."

General MEDARIS. Yes, sir.

Senator JOHNSON. And let the record show that you were denied the kind of program that you asked for.

General MEDARIS. That is right.

Senator JOHNSON. According to your definition.

General MEDARIS. That is right, sir.

Senator JOHNSON. If you do not want to talk about a "crash" program you can quit talking about it. We will talk about something else.

General MEDARIS. I will let it ride with that.

Senator JOHNSON. But you used the comparison that it should have been crash and it was coasting.

General MEDARIS. Yes.

Senator JOHNSON. And then you put in some connecting thoughts there, and I tried to separate them and get to the meat of the thing.

General MEDARIS. I was referring now in these statements to this matter of a bigger engine.

Senator JOHNSON. I think it is a very important statement you make, and I am glad you are making it.

Counsel, proceed; and I apologize for interrupting.

Mr. VANCE. General, is the Redstone program under your supervision and direction?

General MEDARIS. It is.

Mr. VANCE. As I understood General Gavin's testimony last evening, he said that he felt that that program had not been able to go forward as fast as it should. Do you agree with that?

General MEDARIS. I think that is right. I think we could have put it out faster if we had more resources devoted to it.

Mr. VANCE. And you feel it should go forward as fast as possible?

General MEDARIS. It should have been out the day before yesterday, that is right.

Mr. VANCE. What are the factors that caused it to be impeded?

General MEDARIS. Well, again, there was a great debate over whether the Army needed it or not, and this debate took sometime before it could be launched into actual production and fielded.

Then it is a question of the rate at which you put it out, and this was fixed by decisions affecting the amount of resources that could be devoted to it.

I think you will find that we were putting out about half the numbers in quantitative speed that the Army recommended.

Mr. VANCE. When, General, did the Army recommend this?

General MEDARIS. This is about a year ago that they recommended an upping of the quantity on it.

Mr. VANCE. And to whom did the Army make that recommendation?

General MEDARIS. To the Department of Defense in connection with budgetary procedures.

Mr. VANCE. Was that recommendation turned down?

General MEDARIS. Apparently it was. I haven't seen the documents myself, but I was told that we would have to remain at the present rates.

Mr. VANCE. Are there any other factors which have impeded the development of the Redstone program?

General MEDARIS. Not at the present time.

Mr. VANCE. How about in the past, General?

General MEDARIS. Well, originally, of course, in the climate of 1950-51 and before that, because it was 1950 when it was finally approved as a system—there were a couple of changes in objectives that had something to do with it—1951, in the last quarter of 1950 and then again on the 15th of March, 1951, the Army proposed certain rates, which I would rather not discuss openly, for the advance of the Redstone program and the testing of that program leading to production.

And on the 13th of April, 1951, the program was approved in somewhat less than—at about three-quarters the number of missiles, total missiles, for test purposes, and with an immediate limitation to a quite minor number for flight test, and with some very inadequate funds.

Then the Army, however, supported that a little further with some procurement production funds for hardware, and we got out with the first group of missiles.

Now, this was 1951, the first quarter of 1951.

And then it was reviewed again in April. In May the program was reoriented, and, now, it was accelerated again in May. This was in April that it was approved for a lesser amount and some lesser funds. In May it was put back up to the original speed, but—

Mr. VANCE. May I interrupt a moment, General? Was that as a result of the recommendation on your part or the Army that it be accelerated?

General MEDARIS. This was as a result of an Army recommendation, after an Army study on the subject; and then, because of the type of thing that I am talking about before, that the engine doesn't get out ahead of the program, in the last of 1951 it was, it had to be slowed up a little bit because engines were not going to be available fast enough to support it, from North American.

Then on the 26th of November of 1952, the project directors pointed out that the approved schedule could not be realized as an accelerated program with the reduced funds that had been made available for fiscal years 1953 and projected for 1954 and 1955.

Mr. VANCE. Who allocated those funds please, General?

General MEDARIS. Those were allocated from the Department of Defense.

Mr. VANCE. Who, in the Department of Defense, General?

General MEDARIS. I would presume, I think the process was the same as it is now, and I think the committee is aware of the apportionment process and the way the funds are set down to the Army through the channels of the Comptroller.

They are based on the recommendations of, the desires of the Secretary as to what he wants to have done.

Mr. VANCE. General, were you connected with that program at the time?

General MEDARIS. I was connected with it in a different capacity than I am now. I was not the project director.

At that time I was in the Office of the Chief of Ordnance, and I was in and had control of the staff section in the industrial area of the Office, Chief of Ordnance, that handled the processing of all of these projects to the top staff and to the Department of Defense and clears the way for the project directors in the field so I was fully familiar with the program, and in that sense was in it, yes.

Mr. VANCE. And a protest was made at that time?

General MEDARIS. In each and every case that we got less than we asked for, it was also reclama'd, and sometimes we came back with a split the difference and sometimes we did not get anything out of the reclama.

Of course with the inauguration of the Jupiter program and the requirement for Redstone missiles as flight test missiles to support Jupiter, the firings of Redstone were then accelerated under the Jupiter-A program to carry more components for Jupiter because of the higher priority.

Mr. VANCE. Is it your testimony now, General, that that program is not proceeding as fast as it should and that it should be accelerated?

General MEDARIS. It is my feeling that on a time basis for deployment that it is proceeding at the moment about as fast as it can, but that the future roll-on of the program is not at a level that it should be.

It should be approximately twice what it is now.

Mr. VANCE. General, are the Nike-Hercules and the Nike-Zeus, being manufactured or developed, at the Army Ballistic Missile Agency?

General MEDARIS. No, sir.

Mr. VANCE. So they are not within your jurisdiction?

General MEDARIS. No, sir.

Mr. VANCE. Now the satellite program, however, is within your jurisdiction?

General MEDARIS. That is correct.

Mr. VANCE. And as I understand it you have now been authorized to go ahead with a small satellite?

General MEDARIS. That is right.

Mr. VANCE. I am not going to ask you about the date.

General MEDARIS. I am thankful for that, sir.

Mr. VANCE. General, is it correct that at one point when express orders were sent down to the Army not to launch a satellite, auditors from the Budget Bureau checked on your agency to make certain that the orders were obeyed?

General MEDARIS. I don't remember what bureau they came from but I know there were some people who came down to take a look and to be sure that I was not fudging.

Mr. VANCE. General Gavin has said that he believes that satellites should be given greater priority than ballistic missiles.

Do you agree with that statement?

General MEDARIS. I would not want to limit it to satellites.

I feel that the priority should always be on the furthest thing out that you can conceive as a possibility and each thing closer in should be relatively, shall we say of, slightly lesser priority.

The furthest away that you can attain—the priority today should be on the attainment of a space capability by the United States at the earliest possible date.

Now you get all your ballistic missiles if you do that. They will come out just as an outfall of a properly developed forward looking program that has as its aim the development of at the least parity, and hopefully, control in the space area.

So this is beyond satellites.

Mr. VANCE. In effect they are interrelated, are they not?

General MEDARIS. Of course they are. They are all part of the same problem. You cannot divide the question of weapons systems and satellites and ballistic missiles in this field, you are talking about the same basic techniques, you are talking about the same kinds of powerplants, you are talking about applications that cross right over from one to the other, and divorcement of the two simply impedes both.

Mr. VANCE. And they are divorced at the present time, are they not?

General MEDARIS. Well, they were in the Vanguard program. They are not in our satellite program because we are definitely using weapons hardware to launch a satellite.

Mr. VANCE. And has it the same priority as the Jupiter program, for use as a ballistic missile?

General MEDARIS. Yes, they are at the same priority exactly now.

Mr. VANCE. Do you feel that priority should be changed in any way?

SIGNIFICANT PRIORITIES ARE IN AREA OF RAW MATERIALS

General MEDARIS. No; that is all you can get—the top. I have got all I can get. The fact is that where good management is exerted in these programs, the only place where priority really means anything is in the area of raw materials and mill schedules and things of that kind sometimes, test equipment that you want that is standard equipment, where you have got to get in at the head end of a bunch of buyers, and there it is rather more voluntary cooperation of industry since we have no wartime allocation powers today, but this is where priorities really do count and the only place they do because you can schedule your program so you don't have conflicts.

You can do them both. We don't have to give up something to do something more. We have got enough resources in this field to do them.

Mr. VANCE. General, what do you think is necessary for maximum progress in the missile and satellite field?

General MEDARIS. Well, the first thing that is necessary is that we have a few long-range objectives that we would stay on and those long-range objectives must be out ahead 10, 12, 15 years ahead, things we believe we can do in 15 years.

We must be working toward those constantly without any hold-backs in between these terms of a redecision, a redecision, a redecision.

At the very least we must have a year's program at a time. The program must be in our hands, affirmed as to speed, and money

before the end of the fiscal year. It must be there by the first day of July so we are not waiting around trying to find out what is going to happen to us in the next fiscal year.

Before we run out of one we have got to know what we are going to do for the next one, so that as a preliminary we have to have a year of clearance at a time with the resources and the program approvals that are necessary for us to get on with our work.

WITH SHORT TERM OBJECTIVES WE WILL LOSE THE RACE

But the whole must be based around a longer term program that has an objective way out yonder.

I put it this way: That we cannot and will not ever get into this race as we should so long as all of our objectives are short-term objectives.

So long as our objectives are sometimes in this side and sometimes in that side.

So long as a project team does not know where they go next.

We have got to have no finite end to our objectives. The end of our objectives should be as far as we can see at any given time, and we know there is something beyond that. But right now we need a 10- to 12-year program that has as its ultimate goal the manned domination of space, and if we do not, we are going to be in trouble.

Now, if we do that, the weapons will not be hurt. You put us on out into this field of advanced, what I call advanced weaponry—it is the combination of scientific research and vehicles and implements that we know are militarily useful and will be—and you put us on out in there; you are going to get the Jupiter just as fast, too. You may get it a little faster because the byproducts that come out of a broader base of operation over a longer period give you the fruits of your labors much more easily.

I have compared it before, and am happy to again, compare it with the business of growing an orchard. If you uproot all your trees every fall after you collect the apples and start again the next spring with new ones, you do not get many apples. But if you devote your efforts to cultivating good strong trees, the apples come on out of their own accord and you get a good crop every year and every year you get a better crop.

This is the same way with this kind of a problem. If you are reaching as far out as you can go to get the biggest, strongest tree trunk that you can, that is, going for the limit of your vision, the products of immediate necessity and immediate need will come easier, they will come cheaper, and you will never be impeded in getting on as fast as your brains and your intelligence and your resources will carry you.

That is all.

Mr. VANCE. Thank you, General. I have no further questions.

Senator STENNIS. Senator Saltonstall.

Senator SALTONSTALL. General, you are an extremely interesting and informative witness. I would like to ask you just a few questions that have never been too clear in my mind.

First, could you describe very briefly what was the Project Orbiter that you were talking about that was given you?

General MEDARIS. Project Orbiter was a project for the purpose of putting an instrumented scientific satellite in orbit. It had the same purpose, in fact, as the Vanguard project.

Senator SALTONSTALL. Was the Vanguard project in operation at that time?

General MEDARIS. No. This was before the Vanguard project was begun. They were both under consideration by the Stewart committee at the same time.

Senator SALTONSTALL. If the Project Orbiter had been approved, do you feel that you could have launched an earth-circling satellite by now?

General MEDARIS. Oh, very definitely by now. I should say quite somewhat earlier than now.

Senator SALTONSTALL. Would it have interfered with our ballistic-missile program? Your previous answer to that was in the negative.

General MEDARIS. That is right; it would not have interfered.

Senator SALTONSTALL. Of course, you are familiar with the Geophysical Year?

General MEDARIS. Correct, sir.

Senator SALTONSTALL. If we launch a satellite and have the power to put one up, under what obligations are we under the IGY to disclose the power part?

General MEDARIS. My understanding is that we are under no obligations to disclose the powerplant portion. It is only the instrumented payload portion that becomes a part of the scientific experiments and a part of the IGY. This is my understanding. I do not intend to disclose any of ours, I assure you.

Senator SALTONSTALL. That is one thing that I have never quite understood is why have we had to keep a separate powerplant for the Vanguard project as opposed to the Jupiter project?

General MEDARIS. I do not feel qualified to answer that, Senator. I do not know. The whole business has been somewhat incredible to me, so I do not really know.

Senator SALTONSTALL. Put it the other way around then. Could the Jupiter powerplant have been used? Can the Jupiter powerplant be used successfully to launch a satellite?

General MEDARIS. It can.

Senator SALTONSTALL. In your opinion, we are under no obligation to disclose that powerplant if the satellite is launched?

General MEDARIS. That is my opinion. The real exchange of information in the scientific field is with respect to the information that is gleaned by the satellite in the space environment.

Senator SALTONSTALL. Have you provision now to attempt the launching of a satellite or have you been merely ordered to prepare to launch one; help launch one?

General MEDARIS. I have better than that. I have language—I do not know what it is supported by in the Army, but I have language—from the Army that says in good old-fashioned military terminology, "You will on or about such-and-such a date do so-and so." It just delights my soul.

Senator SALTONSTALL. General, your answer is like some Army orders. It is not entirely intelligible to me. Can you put that into layman's English?

SPECIFIC ORDER HAS BEEN ISSUED TO LAUNCH SATELLITE

General MEDARIS. Yes, sir. What I am trying to say is that the directive I now have is in words of one syllable and leaves nothing to the imagination. It says that I am directed to go ahead and launch a satellite on or about a certain date.

Senator SALTONSTALL. And you intend to do so?

General MEDARIS. I fully intend to do so; yes, sir. I have carried out orders all my life and am going to keep it up.

Senator SALTONSTALL. Now, if you go ahead with that work, will it in any way delay your military ballistic program?

General MEDARIS. None at all.

Senator SALTONSTALL. In fact, it might work the other way around; it might accelerate it, might it not?

General MEDARIS. There is no question but what there is derivative information that crosses right over the lines and is extremely helpful.

We also have participation coming up this late spring in some of the Pacific tests of the Atomic Energy Commission with some of our hardware, and this takes a lot of work and sends some people out there. But the derivative back to us is a full payoff. We know that we get a great deal of benefit in our total program by this sort of operation.

Senator SALTONSTALL. There are several points that you brought out through questioning by Mr. Vance that are not quite clear to me.

First, you said that this nose cone you were now satisfied with so you put it on the shelf. In putting that nose cone on the shelf, I think you added the words "for possible use in a satellite." If you put a satellite up into an orbit, is it part of the experiment to get that satellite down again?

General MEDARIS. No, no; it is not the nose cone that we put on the shelf for possible use as a satellite. It is the propulsion hardware that would launch these test nose cones. This is what is applicable to a satellite. The same test vehicle, the same missile that we use to launch the test nose cone requires only a return to its original state and the addition of a couple of minor components to become a satellite carrier.

Senator SALTONSTALL. That is to give us the proper degree angle and so forth?

General MEDARIS. That is right; to put it in the proper position in space to add the velocity that is necessary for a satellite.

Senator SALTONSTALL. But that does not have to do with the thrust power for a ballistic missile then, except in its very extended stages?

General MEDARIS. It starts off with the same booster to get it off the ground that we use in a ballistic missile, and the upper stages are applicable to missile projects, both small and large. They are taken, some of them are taken from other missile projects actually, and you put them together as we have done in a composite missile of multiple stages, and then it is a question of how are you going to use your guidance system. Do you want to go straight up or do you want to go up and out or do you want to go into a satellite path or do you just want to throw something as far as you can.

Senator SALTONSTALL. And that is the thing you put on the shelf?

General MEDARIS. That is right: the propulsion units for this are what we then put on the shelf because we did not need them any longer for that test program. We had them in various stages of completion. We had a couple of them about finished. We had 4 or 5 more that were coming along.

Senator SALTONSTALL. You said that a bigger engine was not being experimented with or being researched, because there was no definite goal for the use of that engine. That was the reason that it was stopped or that there was no development on it. Now, what about the Atlas? Does that not need a bigger engine than anything that has yet been developed?

General MEDARIS. The Atlas and Titan engines are achieved by putting together more than one unit of the same kind of engine that is being used for the Jupiter.

Senator SALTONSTALL. So that what you say in substance is that we ought to try to develop now a bigger engine than any engine that we now have for simplification or for a further thrust?

General MEDARIS. It is a for further thrust. You can package successfully only so many multiple units. And if you want a bigger total thrust, you have to start out with a bigger engine, or building block, or element in a bigger thrust. Because I have no responsibility to carry this out, I think I can say in open meeting that it is my personal opinion unless this country can command 1 million pounds of thrust by 1961, we will not be in pace.

Mr. WEISL. Will not be in what?

General MEDARIS. In pace, we will not be in the race. We will not be where we ought to be.

Senator SALTONSTALL. If you can say in open hearing—and if you cannot, say so—how many million pounds of thrust are we developing at the present time?

General MEDARIS. I do not think I should go into that in open hearing, Senator. As I say, I have no responsibility for that further achievement. There has been none placed on that level, and therefore I think I am proper in making that other statement.

Senator SALTONSTALL. You have kept to your schedule up to the present time on the Jupiter?

General MEDARIS. We are ahead of our schedule at the present time.

Senator SALTONSTALL. Are you satisfied with the decisions and the methods of making those decisions now?

General MEDARIS. No, sir; I am not.

Senator SALTONSTALL. What further do you want or do you believe you should have that you are not now getting?

General MEDARIS. I feel that in order to do my job, the jobs that are assigned to us, Dr. von Braun and myself, in the best interests of the country and as fast as we can, some place there has to be one man who has the complete power of decision who will make a decision when I go in and talk to him, and who, if he makes a decision, can hand me the resources to carry it out the same day.

Senator SALTONSTALL. That is now being worked out, is it not?

General MEDARIS. I do not know how far they are along that path.

Senator SALTONSTALL. I agree with you; that is beyond your province.

General MEDARIS. That is correct.

Senator SALTONSTALL. But that is the effort that certainly Mr. McElroy and Mr. Holaday have——

General MEDARIS. I have been somewhat disturbed by some of the conversation on the subject because I am not talking about a super-agency and I am not talking about a great staff. I am talking about the power of decision that rests in a man who will ride with his own answers. This is what I am talking about.

Senator SALTONSTALL. That is what we all want. Now, are you satisfied today with the priorities that you now have for your projects?

General MEDARIS. I am satisfied with the priorities, yes, sir.

Senator SALTONSTALL. Are you reasonably satisfied—I add the word “reasonably”—with the progress that you are making?

General MEDARIS. I am definitely satisfied with the progress that we are making.

Senator SALTONSTALL. And are you satisfied with the amount of funds that you now have?

General MEDARIS. I am not.

Senator SALTONSTALL. And you never will be?

FUNDING ON SHORT TERM BASIS UNSATISFACTORY

General MEDARIS. No, sir, that is not true. That is not true, Senator. I have consistently and at all times made the best possible estimates of my fund requirements; and if I am given what I feel in honest, good business and technical judgment is needed, I am satisfied. But I need it for more than 2 months at a time.

Senator SALTONSTALL. What you do want is to be able to tell a year ahead, at least a year ahead, how much funds you are going to have for that year?

General MEDARIS. That is correct, sir.

Senator SALTONSTALL. I am heartily in sympathy with that. And what you would like to have would be, we will say, like the authority for building an aircraft carrier, that is the authority to obligate funds for 1, 2, or 3 years in advance if it is possible to do that?

General MEDARIS. If possible, that is what I would like to have. I would like to see a project in a package that I could see down the road and could, in effect, tell anybody who was interested: “Come back and look in a year from now and if you are not satisfied with my job, take me out and put somebody else in, but do not look at me in the meantime. Let me alone. Let me go to work.”

Senator SALTONSTALL. Just one final question. You stated that you believed that we should have a goal say of 15 years in advance, and work toward that goal and take steps along toward that goal.

I listened with a great deal of interest to Dr. Teller the other day. The problem that we have there is to determine whether we are willing to take the risk, is it not, of building up parts of a project which may become discarded because something better will be found or the project may be changed in the long-distant future.

In other words, there is a risk, is there not, from a scientific viewpoint?

General MEDARIS. There is a certain amount of risk of course. We find out nothing new in this world without taking some risks, because if we knew always exactly what we were doing, we would not need development programs.

We would only need manufacturing programs. We would not need research because we would always know, and there is always a risk when you go out to try to do something that you today don't know exactly how to do.

The risks, however, if properly spread and if the program objectives are correct, you can evaluate these risks very carefully, and you know that they are not sufficient to overcome the advantage of the total program.

But you have to take a certain amount of risk.

This is true. You are not going any place if you do not.

Senator SALTONSTALL. In other words, you begin with basic research.

General MEDARIS. We begin with basic research but I feel there has been a little too much talk about basic research and too little talk about the great field that is between basic research and a finished project.

Basic research, as we understand it technically, means the investigation of the physical fields to derive new principles, to answer questions that are not now capable of a final answer.

Now you can get a lot of basic research for not too many dollars. If you double the whole basic research, in the true sense, basic research program of the country, you are not talking about a whole lot of money in the terms we talk about now. But now right behind that comes the question of translating this principle into a workable experimental piece of hardware that will prove out the principle on a scale that is usable.

I might put it this way: The principle of the internal-combustion engine was discovered in a laboratory, shall we say, but then somebody had to build an automobile engine big enough to run something, and until that engine was built, he did not know whether he could have an automobile or not. The same thing is true in all of these, and that intermediate field is the costly one, and that is the field where the real increase in effort is required.

Again I come back to the question of an engine that we don't now know exactly what we are going to do with it.

We know about what we ought to do with it when it comes along, but beyond the needs of an immediate hardware project, to develop an engine, this is money, whereas basic research is of a different order of magnitude.

Now basic research puts new knowledge into the system. Without adequate basic research, we have no objectives, and we do have too high a risk in the individual projects if we have not had sufficient basic research, because we still have too many questions when we go for a piece of hardware.

Senator SALTONSTALL. Fundamentally what you are saying is that we should look forward on a longer term basis than we have up to the present time, and to work on all of our various types of basic science, our basic research, our industrial research, our development on a longer term basis. If we have that, then we will get ahead in the control of space, you say.

THE THREE STAGES FROM RESEARCH TO FINAL PRODUCT

General MEDARIS. That is correct, sir, and I might summarize it in three stages in this way: the basic research we should be doing today should be adequate to solve the questions that will lead to hardware 15 years from now.

The applied research, the intermediate area, should be today devoted to those tools that we know we will use 6 to 10 years from now, and then your actual development of an end product is devoted to that thing that you are going to need 2 or 3 years from now.

This is the proper time schedule, but unless you are looking all the way down that 15 years you cannot go on this kind of schedule.

Senator SALTONSTALL. Thank you, sir.

Senator STENNIS. Senator Flanders.

Senator FLANDERS. General, I am interested in your use of the word "mobility" in application to the Jupiter.

General MEDARIS. Correct.

Senator FLANDERS. From my number of hours spent out on the coast looking at the operations there, and I might say we are coming down to Redstone, too—

General MEDARIS. Delighted.

Senator FLANDERS. Because I find that several days of hearings will be the equivalent of a few hours of observation and conversation.

General MEDARIS. Yes, sir.

Senator FLANDERS. So I am looking forward with tremendous interest to going down to Huntsville.

General MEDARIS. We will be delighted to have you, sir.

Senator FLANDERS. Now the word "mobile," was not used in any conversations we had with reference to the Thor.

The word used was "movable."

Do you feel that there is greater mobility through Jupiter and from the standpoint of the ground installations than there is from Thor?

General MEDARIS. The Jupiter was designed originally, Senator, to be a ground mobile weapon. The original engineering design was according to Army concepts of employment, which is mobility.

JUPITER IS EXTREMELY MOBILE SAYS GENERAL MEDARIS

Therefore it is capable of being put on mobile ground equipment. That was the original objective of the program.

Now I think it is rather obvious that anything that can be mobile can also be movable and it can also be fixed to a piece of concrete if you want to, but if you do not start at that end, it is a little hard to get that.

Senator FLANDERS. The distinction was made between "mobile" and "movable." I suppose—would you feel that a distinction could be made between those words, those two words, in the sense of keeping up with an Army, a moving Army so far as the launching bases and equipment are concerned?

General MEDARIS. If we are to keep up with the moving Army so far as launching bases and equipment are concerned, we must be mobile.

Senator FLANDERS. Yes.

General MEDARIS. Now the mobility, the potential mobility of the Jupiter system and the actual mobility of the Redstone system are

much to the amazement of many greater than they were of an 8-inch gun battery during World War II.

Senator FLANDERS. Mr. Chairman, that fits in with the suggestion I made yesterday that the Army should be assigned all missiles which are in some real sense of the word mobile rather than specifying range or other physical characteristics.

I find, General, that there are certain—there is a certain vocabulary which goes with the missile business. I get these words from time to time from your testimony, I get them out in Los Angeles. One you used, and you defined it, yet I have not quite got the word yet, that is the word "configuration."

Is that a missile word for "design," a design?

General MEDARIS. We use the word "configuration," Senator, to cover the entire subject of overall design, outward appearances, number of stages, design of each stage from its outer appearance, and the basic principles, the basic methods by which the missile is to be controlled.

So I use configuration in the sense slightly different from final complete design, because there may be internal refinements; there will be.

If there were not any need for those we would not have a development program, we would have gone right into production 2 years ago, but when we fly a configuration we have now aboard the missile everything that is essential to the operation of the missile, and in the same form of control that it will be finally used.

Senator FLANDERS. I think I am getting that now.

When an amateur, like those of us over here, is thinking about mobility, the question arises in our minds as to whether there is not greater mobility to the missile with the solid propellant than there is to the liquid.

General MEDARIS. This, Senator, can be the subject of considerable lengthy discussion but I will try to brief my own approach to this problem very quickly for you.

The difference between the solid propellents and liquid propellents in some sense is like the difference that has existed for years between gasoline engines and diesel engines. Both are good. For any design purpose the engineer must select that which, considering all conditions, is best for his purpose.

There were some frustrating problems years ago to adapt diesel engines to aircraft, to cut down the fire hazard but because of the characteristics of the diesel engine it was found it did not work very well and it was discarded as an approach to aircraft power.

So that in the same sense you can look at solid and liquid propellents; each has advantages, each has disadvantages. Neither one is a final answer to all your problems, and for any given missile at any given point in the time scale a decision must be made by the designer as to which has the characteristics that fit the requirements at that point.

Now when you talk about the mobility of a solid propellant, there is one thing that is somewhat overlooked and that is you have to move more weight in one package in a solid propellant than in a liquid propellant missile. Because we can move a liquid propellant missile empty and fill the tanks wherever we have to go.

Whereas in a solid propellant missile you have to move the whole gross weight at one time so you are not too sure about this mobility when you get beyond a certain weight.

Senator FLANDERS. Of course I am thinking about the ground equipment required.

General MEDARIS. Well, the ground equipment for the same size of missile must be heavier for a solid missile than it is for a liquid missile.

Senator FLANDERS. I don't think it is necessary to go into that in detail now, but what you say interests me because one's first thought would be that the solid propellant would require a very much simpler and less expensive ground equipment than the liquid.

General MEDARIS. This is not totally true. There are differences, both ways, but let me show some of the problems in this form, if I may, Senator.

As long as you are dealing with small missiles that are within the proper load when they are fully loaded with solid propellents (within the proper load of normal road transport) there is no question about the advantage of solid propellents with a small missile.

When you get up into the bigger ones the question is do you want mobility or don't you, because if you want mobility, at a certain point you get too big a chunk of powder to carry at one time and now you are in trouble. You either must divide it and assemble it on the spot which decreases reliability, or you must get some tremendous type of carrying mechanism that will carry the whole gross weight at one time.

Senator FLANDERS. Yes.

NEITHER PROPELLENT SATISFIES ALL REQUIREMENTS

General MEDARIS. So you get a changeover point.

It also applies to the Navy's decision, because of the way they are going to use a missile. They load it off dockside with great big cranes, it goes into position in a ship and it stays there, so the question of having to handle it in bigger weights is not important, and there are advantages that offset that for the Navy. But this comes back to my conclusion that neither one is the final answer to anything.

We are using them in combination in these multistage missiles. We have liquids for first stages and solids for upper stages.

In every case the choice must be a careful choice based on the known characteristics and what are you trying to do.

This is the whole business.

Senator FLANDERS. My only point in bringing this up at this meeting is in connection with this point of mobility as distinguished from what is movable, and I think you have answered all I need to know at this point.

General MEDARIS. Thank you, Senator.

Senator FLANDERS. Mr. Chairman, that is as far as I am prepared to go on the questions I have prepared.

Senator JOHNSON. Senator Stennis?

Senator STENNIS. General, my questions will be limited in number, but I want to say that you have summed up here in a few words, better than anyone else, I believe, what is the need for a top, overall Director or Manager. The way you expressed it was that you needed someone who can make a decision and then hand you the material. I assume that includes the money—

General MEDARIS. That is right.

Senator STENNIS (continuing). To carry it out.

General MEDARIS. That is right, sir.

Senator STENNIS. I commend you for your statement of that. I have run across statements of others to the effect that, after all, the President of the United States is the Director of the missile program, and that of course he is going to take care of it.

I am afraid we are misled by those words. I do not expect your comment on that.

I know if the President had nothing else to do, he would certainly be an excellent Missile Program Director. But he has literally thousands of other major things to do. He does not have a chance to supply such a role as that.

And I believe, with you, that nothing short of someone charged with that responsibility, primarily and solely with that responsibility to make plans and make decisions, and send you gentlemen on the firing line, so to speak, the goods to carry it out.

I want to direct your attention now to your military construction program. I am familiar in part with that.

You had an authorization last, for the current fiscal year, of \$25 million, a blanket-type authorization. You have mentioned that you had \$17 million of that which had been made available to you; is that correct?

General MEDARIS. Well——

Senator STENNIS. The appropriation followed up that authorization, I recall.

APPROVAL GRANTED FOR \$17 MILLION OF \$25 MILLION APPROPRIATED

General MEDARIS. That is correct, sir, and the appropriation, the congressional action, was completed. This was for fiscal year 1957. But, of course, it is no-year funds, so it is still available.

Senator STENNIS. Yes.

General MEDARIS. This appropriation was in the amount of \$25 million in support of the Jupiter program. That is correct. To date, we have had approval for specific projects only to the extent of \$17 million.

Senator STENNIS. All right.

That means the other \$8 million, then, appropriated expressly for this program, has been held back. Have you requested more than the \$17 million?

General MEDARIS. Yes, sir.

Senator STENNIS. And you felt, of course, the need for it or you would not request it, you would not have requested it.

General MEDARIS. Certainly not.

Senator STENNIS. Do you still need it?

General MEDARIS. The projects are still in, requesting approval; yes, sir.

Senator STENNIS. Is it going beyond classified material to ask what projects have been denied?

General MEDARIS. These are——

Senator STENNIS. I will not press that question. That is your judgment, sir.

General MEDARIS. There are four projects for the augmentation of our necessary test and laboratory facilities at ABMA; yes, sir.

Senator STENNIS. And those four projects are included in your \$8 million?

General MEDARIS. That is correct, sir.

Senator STENNIS. Not only has this been authorized, but funds have been appropriated?

General MEDARIS. That is right, sir.

Senator STENNIS. Where is the holdback on that? Do you know who is holding that back? Is it the Director of the Budget, or the director of the budget for the Department of Defense, or just where is the holdback?

General MEDARIS. I cannot say, sir. The internal operations are in the Ballistic Missile Committee of the Department of Defense. I am not privy to what they do inside.

I know it is in there, and I know it does not come out. That is all I know.

Senator STENNIS. That is another illustration for the need of the individual you described, who could make a decision and then hand you the material to carry it out.

General MEDARIS. That is correct, sir.

Senator STENNIS. You do not really now know where to turn to pin down the point about this \$8 million; do you?

General MEDARIS. No, sir. I beat on the head of the man I know had it last, but— [Laughter.]

Senator STENNIS. I think that well illustrates what we have been driving at here.

May I present a letter from Dr. J. A. Van Allen, who is the head of the department of physics at the University of Iowa, and direct your attention to a statement made by Dr. Van Allen. This letter has been referred to before and has been included in the record. I will read a short paragraph and request your opinion of it.

In the satellite field, it would have been technically feasible for the United States to place satellites in orbit at least as early as October 1956, using the Army's Jupiter-C. But the Army's proposal to do this was voted down within the Defense Department in the summer of 1955 in favor of having the Navy undertake the development of a complex new vehicle for the purpose. This decision, which has been actively contested by some of us throughout the past 2 or 3 years, was defended in terms of not interfering with direct military developments.

Here is the point I want your opinion on:

However—

he says—

the true overall effect has been exactly the reverse, since a fresh set of difficult missile developments was imposed on commercial contractors—Glenn L. Martin Co., Aerojet Engineering, Grand Central Rocket, and so forth, who were already deeply involved in the development of purely military vehicles. The proposed Jupiter-C system was to have been examined—

and so forth.

Do you agree with his statement here—and this is not trying to find blame, but seeking guidance for the future—that the very reverse turned out to be true, that there was an actual interference with the military missiles because it imposed new and additional burdens on these manufacturers? Was he correct in that, or not?

General MEDARIS. As a matter of principle, I believe he was correct. The particular companies involved are not a part of my project, and therefore I am not able to define the exact interferences.

Senator STENNIS. Yes.

General MEDARIS. But I believe sincerely that he is right.

Senator STENNIS. I beg pardon?

General MEDARIS. I believe sincerely he is right in everything he says.

Senator STENNIS. He is correct on the principle in that paragraph?

General MEDARIS. Yes, sir.

Senator STENNIS. I thank you very much, Mr. Chairman. I yield the rest of my time.

Senator JOHNSON. Senator Symington?

Senator SYMINGTON. Thank you, Mr. Chairman.

General Medaris, it is a pleasure to see you. I think we have known each other before either one of us knew anything about missiles.

General MEDARIS. Yes, sir.

Senator SYMINGTON. I am sorry I was not here to listen to the very able questioning of you, not only by the chairman, but also by the brilliant young assistant chief counsel, for whom we are having increasing respect as he prepares these hearings under the direction of our also very able chief counsel.

I remember your previous appearance before the Armed Services Committee of the Senate, and also before its subcommittees.

Let me congratulate you for the job you have done down at Huntsville, for the sincerity and the effort you put in. It makes me proud to be a citizen of a country that has people like you.

General MEDARIS. Thank you, sir.

REAFFIRMS STATEMENTS AS TO PROGRESS IN 1945-50 PERIOD

Senator SYMINGTON. At the hearing last year, you said, and I quote:

During this period 1945 to 1950, Dr. von Braun and his group were able to develop those basic requirements for sound development of heavy, medium, and long-range missiles that are essential to the progress being made today.

You then went on to say at one point that:

In 1950, the Redstone project was started as the first development project of this type to develop a weapon.

And further along in the testimony, it was pointed out that the Redstone was the experience backup for the development of the Jupiter.

What are your thoughts today, about those statements made over a year ago? Do you still feel that way about it?

General MEDARIS. Yes, sir.

Senator SYMINGTON. The first Redstone was fired, I believe, in 1953; right?

General MEDARIS. You will permit me to verify the date here, sir.

On the 20th of August, 1953, Senator.

Senator SYMINGTON. I know you must have answered questions as to why we have not proceeded further, but we have all known for a long time about the growth of Russian strength.

I was interested in the questions asked you by Senator Stennis. Why do they not give you enough money to do this job right? What is the reason for holding up the funds you want?

General MEDARIS. I do not know, Senator. I frankly do not know.

So far, eventually I have gotten the money to get on with my projects so far as Jupiter is concerned, generally at the stated figures that I required, but I have gotten it in fractional pieces and I have been late getting it, and that sort of thing.

But the reasons behind this, I am not qualified to answer, Senator.

Senator SYMINGTON. When did they take the wraps off of various controls, and let you go ahead with the Jupiter project on a highest priority basis?

General MEDARIS. Well, the project, the initial approval that put us into the Jupiter business on the highest priority basis was, I believe, in November; the directive was dated around the 8th of October, was it not, 1955—November 8, 1955.

That was the go-ahead directive on the Jupiter and placed it on the highest priority.

Senator SYMINGTON. How can you be working on highest priority if you do not have enough funds to pursue it?

General MEDARIS. Initially, on the first go-round, we got the funds for the first 6 months of operation, we got the funds we asked for and got them immediately.

The stops and starts did not materialize until in the early fall of 1956.

Senator SYMINGTON. The early fall of 1956?

General MEDARIS. That is right, sir.

Senator SYMINGTON. What were those stops? What happened at that time?

General MEDARIS. There was the point where the uncertainty was injected into the picture as to whether the Jupiter was going to go through to a weapons system, or whether day by day it might be canceled in favor of the Thor project.

And from that date on until just very recently, we sort of were in the position of a patient that has been given a death sentence by the doctor, but we kind of refused to die.

Senator SYMINGTON. And now your sentence has been commuted and you see some green lights ahead, is that right?

General MEDARIS. That is correct, Senator.

Senator SYMINGTON. As a matter of fact, I would say more than commuted. You have been pardoned.

General MEDARIS. Yes, sir, I hope so.

Senator SYMINGTON. Now, we are going to make both missiles, is that right?

General MEDARIS. That is correct, Senator.

Senator SYMINGTON. Do you know yet whether you have enough funds to proceed on that basis?

General MEDARIS. At the moment I do not. I understand that the budget as we have submitted it has been approved, and that we will in, shall we say, due course get the money, but at the moment I do not.

Senator SYMINGTON. You are going to have to tool this missile, are you not?

General MEDARIS. That action was started some little time back, and, of course, in the actual course of developing the missile, we have fully tooled our own line.

Senator SYMINGTON. I understand.

General MEDARIS. And we started, and since that line was developed in conjunction with our prime contractor for production, the Chrysler Corp., with their tool engineers, the duplicate tooling of that line was started on its way to Chrysler in September.

Senator SYMINGTON. Are you satisfied with the Jupiter missile? Do you think it is a good missile?

General MEDARIS. I think it is not only a good missile. I think it is a rather incredible missile, and this is an objective statement. I want to put that on the record, although nobody will believe it, but I will put it on the record anyway.

Senator SYMINGTON. If the Thor were a better missile, would you be glad to use the Thor?

General MEDARIS. I think I have a reputation for having canceled out unproductive projects without restraint when I felt that they were not in the best interests of the country, and I would honestly, if I thought the Thor had the better chance of coming out to be a fine operational weapon, I would be tickled to death to use it and stop the Jupiter. I do not believe so, though.

Senator SYMINGTON. You believe the Jupiter is better?

General MEDARIS. I believe the Jupiter is the better weapon.

Senator SYMINGTON. In any case, I think we both believe it is a good idea to make them both and prove it out?

General MEDARIS. I think under the present circumstances, if you want to get the earliest possible operational capability, that it is a worthwhile effort in that direction. You have a higher assurance. Of course, there is another thing that enters in, too; Senator, and that is psychology enters into these things. Although we hold ourselves to have rigid standards—and I would hope that this would not apply as much to us as it might to others because we can stand out against this sort of thing—nevertheless I think we have to recognize that so long as there are two projects in competition, the sense of urgency on the part of each is a little bit higher, and probably we get an earlier missile by reason of the fact that neither one of them will let things stand in their way that ordinarily might be an adequate excuse for waiting a little bit.

Senator SYMINGTON. And that is the way it is working out now?

General MEDARIS. That is the way it is now, yes, sir.

BALLISTIC MISSILES SHOULD BE IN THE HANDS OF THE GROUND FORCES

Senator SYMINGTON. How about the mission angle of it? Who do you think should have the mission on the IRBM?

General MEDARIS. Of course, I am committed to support as a project director of any force that is assigned the use of our missiles, and I do not recant that commitment and I will give anybody the best support that I can.

As a professional, however, I have to agree with such people as Air Chief Marshal Joubert who made a study of this subject and came up with the conclusion that missiles as an extension of artillery should be in the hands of the ground forces, and with the conclusions of the Russians who have committed their missiles entirely to their army force, and I have to agree that in my professional opinion that is where they belong.

Senator SYMINGTON. But if you had adequate unification of the services, proper unification of the services where you are working all

together instead of arguing about these missions, then the question of who was going to do it and take it over in his own backyard would be relatively secondary, would it not?

General MEDARIS. This is true. However, I do not think it quite gets to the heart of the matter, if I may apologize for saying it that way. The heart of the matter, to my mind, is that the system of assigning roles and missions to the Armed Forces will never give us anything but argument and discussion.

I cite you the possibility of the case of a dispute between two craft unions over who was going to be allowed to use a pair of pliers, and I do not think we could come up with any sound decision as to the proper field for both the carpenter and electrician if their role or mission was decided on what tools they were permitted to use. And that is the problem we are into with this roles and missions business.

The basic business of assigning roles and missions on the basis of a single tool will never resolve the question of argument and rivalry. It is an inadequate approach.

Senator SYMINGTON. General, I do not think I have ever heard it put better. I was distressed when the Congress took upon itself to legislate roles and missions, and I have been distressed that little or nothing has been done to iron this problem out in the Pentagon in recent years. If the roles and missions are legislated, it seems to me incredible the Department would make an arbitrary statement and say you cannot have a missile in the Army beyond 200 miles.

Do you agree with that?

General MEDARIS. I think that is a very unwise approach to answer.

Senator SYMINGTON. In other words, you automatically block normal engineering and scientific development if you approach it that way?

General MEDARIS. This is true.

Senator SYMINGTON. But if people like General Gavin and General Lemay were working together, without these arbitrary fixed divisions, you would do the best job in defense of the country, at the least cost. Is that correct?

General MEDARIS. I think this is true, and I think we can go a step further: That there ought to be a way to define missions in terms of what should be accomplished rather than what should be used to accomplish it with, and then the forces should be allowed to have any tool that they deem necessary to the accomplishment of that objective. And if the roles and missions were defined in terms of objectives to be achieved rather than the means to be used, I think we would have an end to this business of fussing between the services entirely.

Senator SYMINGTON. Mr. Chairman, the witness' testimony is based on his obvious intelligence; and also on his experience and understanding of the problem. I will not pursue it this morning, but I do hope, Mr. Chairman, there will eventually come a time when we will face up to this situation, one which is costing the American taxpayers unnecessarily billions of dollars a year.

I thank the general. I have no further questions.

Senator JOHNSON. Thank you, Senator Symington.

Any further questions of any member of the committee?

General Medaris, I have a few questions. I was out of the room when it came my time. I would like to ask you to state as succinctly

as possible what you recommend doing to accelerate the operational status of the intermediate missile?

General MEDARIS. To accelerate the operational status of the intermediate?

Senator JOHNSON. The intermediate range missile?

General MEDARIS. I believe all that is necessary to get the maximum acceleration of that is a clearly defined objective for the project in terms of quantities, in terms of force, manning, and in terms of the concept, to be used, the provision of funds for at least 1 year ahead, and then let me alone.

Senator JOHNSON. You don't have that now.

General MEDARIS. No, sir. I have part of it. I have parts of each but I don't have all of any of those.

Senator JOHNSON. We will see what we can do to give you a lift there, General.

The one impression that I have gained from hours of hearings thus far, and I don't want to preclude arriving at some other conclusions, but the one that I am positive about now is this: We have reached a point in the history of our country when it is time to send for the sundowners.

I don't know whether I ought to take the time of the committee to elaborate on that or not, but any of the old Navy men around here will be familiar with the term.

Now General, I want to ask you if this is a fair way to summarize your testimony. You requested priorities time and time again and did not get them, is that right?

General MEDARIS. Oh, no, sir, the priorities we have had.

Senator JOHNSON. Without limitation.

General MEDARIS. Sir?

Senator JOHNSON. You requested priorities without limitation; isn't that your testimony?

General MEDARIS. No, sir. Resources is the question.

The request has been for resources, and they have been given limitations, and in partial form. The priorities as the term is understood, we have continuously had the highest priority which we could extend to our demands on other people, but your ability to use a priority is limited by your resources.

REQUESTS ONLY PARTIALLY FULFILLED

Senator JOHNSON. All right, so you got the priority but it was not implemented.

General MEDARIS. This is correct, sir.

Senator JOHNSON. You protested limitations on overtime, allocation of manpower, facilities, research funds and nothing was done about it.

General MEDARIS. This is correct, sir. I won't say nothing was done about it because in each case something was done about it.

I got part of what I asked for in every case.

Senator JOHNSON. But not enough was done about it?

General MEDARIS. But not what I had asked for, sir, which I deemed to be necessary.

Senator JOHNSON. You told the Defense Department that a large-thrust engine running up to a million pounds, unless we had that we would likely lose the race with Russia by 1961, and they did nothing about it and have done nothing about it.

General MEDARIS. I could not put it in those terms. I have made that statement. I have made it both officially and here to the committee. I have not been in a position to make any such recommendation direct to the Department of Defense. We did, however, recommend and request the privilege of developing a higher thrust engine than that now available to us, and that request was turned down.

Senator JOHNSON. But you do recommend that to the committee and that does represent your view?

General MEDARIS. That does represent my view; yes, sir.

Senator JOHNSON. Funds have already been appropriated but allocation to you has been held up; is that correct?

General MEDARIS. That is correct, sir.

Senator JOHNSON. You had difficulty in getting decisions in the Defense Department?

General MEDARIS. That is right, sir.

Senator JOHNSON. We have had some recommendations. Were you present in the committee yesterday?

General MEDARIS. No, sir; but I am familiar with the proceedings, Mr. Chairman.

Senator JOHNSON. Did you hear the recommendations that were made by the scientists and manufacturers and various groups that we presented to each witness?

General MEDARIS. Yes, sir; I have heard those.

Senator JOHNSON. Are you in general agreement with those recommendations?

General MEDARIS. I cannot say that I am entirely, sir.

Senator JOHNSON. Would you specify in what regard you disagree with them?

General MEDARIS. The basic recommendation that there be an independent commission or independent agency to conduct these programs I do not agree with, sir.

Senator JOHNSON. What is your view about that?

General MEDARIS. My view is that—

Senator JOHNSON. Strike out the words "civilian commission"?

General MEDARIS. Strike out the word "commission."

We already have too many committees and commissions. I do believe that one individual must be charged with the responsibility. I believe that we may impede the program if that individual is charged with setting up an agency or great staff or top organization of his own.

I believe he must be an informed individual of greater courage and empowered to make his judgments and back them with the resources necessary to carry them out.

I believe that that individual can properly and should properly be within the Department of Defense, since otherwise you will have great collision of resources throughout the whole system by his being, by there being unfamiliarity with the current state of other things which affect the availability of resources and manpower in the different areas required to carry these things out, whereas if he is working as a direct subordinate of the Secretary of Defense, he will normally and naturally be fully informed all the time with respect to the current status of other demands, and will therefore place his charge, place his requirements, on people who are most able to carry them out, and without conflict with other problems.

Senator JOHNSON. In what other respects do you disagree?

General MEDARIS. I have to put a question mark on the second one with respect to a permanent, adequate, and competent staff in the Department of Defense to provide for better basic research.

I think there has been an adequate staff, maybe more than enough.

Again I come back to the fact that by tradition, by practice, by experience, the power of decision can best be handled by an individual who is held responsible for his results, and when we talk about staffs and commissions, I always get nervous because I am overcommitted right now, so I think more in terms of the successful accomplishment of these things by charging a man, an individual, with a responsibility.

He has the entire resources of the country to call upon for advice and assistance.

Senator JOHNSON. You would emphasize the competent?

General MEDARIS. I would emphasize the competent and not talk about a staff. I would talk about a man. This is the difference, about an individual.

Senator JOHNSON. Any other suggestions?

EARLY AND FIRM DECISIONS AND LONG-TERM PROJECT BASIS NEEDED

General MEDARIS. The other, I am in general agreement with. The early and firm decisions is the one that I would put as the headliner of the whole business, and second, the 3- to 5-year basis of being able to look ahead on your projects.

The question of leeway to contractors in making technical decisions depends on the nature of the beast that you are developing or the project that is being carried out.

I think where we put a thing out on a weapons-system basis to a contractor, obviously he must have great latitude in making technical decisions.

Where, however, that contractor is subordinate to an engineer group that is responsible for the overall system, then he must be highly limited in making technical decisions, because otherwise you have an incompatible system very quickly.

So this depends on the relationship in the particular project, what you have set up.

Senator JOHNSON. What do you think about General Doolittle's and General Gavin's general staff proposal?

General MEDARIS. Well, this is a thorny problem.

Senator JOHNSON. It is the only kind we ever get up here.

General MEDARIS. I know that, sir, and I feel deeply for the committee in their approach to these things.

Senator JOHNSON. Thank you, General.

Tell us what you think about this suggestion.

General MEDARIS. I think that probably the nearest approach to a sound solution to the whole is that that was advised yesterday by General Gavin.

Senator JOHNSON. Are you in general agreement with General Gavin's testimony of yesterday?

General MEDARIS. I am, very definitely.

Senator JOHNSON. Do you desire to be associated with it?

General MEDARIS. I love it. I am associated with him and I enjoy it thoroughly.

Senator JOHNSON. You love the testimony or love him?

General MEDARIS. I said I love the association, sir.

I am delighted to be associated with General Gavin in any project.

Senator JOHNSON. We are very honored to have with us this morning one of the wise men of our time and one of the great men of the Senate, Senator Hayden.

Senator Hayden, I wonder if you care to ask any questions of the witness.

Senator HAYDEN. I just came in to observe, thank you.

Senator JOHNSON. That proves the first part of my statement about how wise Senator Hayden is.

General Medaris, you have been a very interesting and very informative and helpful witness. You appear to have great confidence in your mission and the men who are working for you.

We want to thank you for coming here and making these constructive suggestions to the committee.

We hope that your confidence will be justified in terms of results and achievements, because there is no question in my mind about this being a critical hour in our Nation's history, and if there is anything America needs, it is achievement right now.

Senator Saltonstall?

Senator SALTONSTALL. Thank you, Mr. Chairman.

General Medaris, I have listened with a great deal of interest to you now for 2 hours.

Boiled down what you need most in your opinion to go ahead with your projects satisfactorily is the authority to make a decision in the Department of Defense, which will give you clearance to move forward.

That is the main thing.

The second is that you would want funds on a longer term basis, and over the long range if the law should be changed, then you would believe that we could advisedly go into a different system of planning in the top echelons of the Joint Chiefs of Staff.

Does that sum it up?

General MEDARIS. I think so; yes, sir.

Senator SALTONSTALL. Thank you very much.

Senator JOHNSON. Thank you very much, General.

You are excused.

General MEDARIS. Thank you, sir.

Senator JOHNSON. For the information of the committee I should like to say it is our plan to recess in the neighborhood of 1 o'clock and come back about 2:30 and run until late this evening, but we don't plan to have a late evening session.

It may run to 6:30, 7, or 7:30 if that is necessary.

Of course we will have hearings Monday and at least through Tuesday of next week.

Our next witness is Dr. Wernher von Braun, the Director of Development Operations Division of the Army Ballistic Missile Agency.

The committee is particularly fortunate in being able to receive testimony from a man who has literally devoted his life to the scientific field of rockets, missiles, and space vehicles.

Dr. von Braun, I hope you will come forward and take your seat at the committee table.

At the age of 18, Dr. von Braun joined the German Society for Space Travel, and since that time has worked in this field.

In 1937 he became the technical director of the Peenemuende Rocket Center in Germany, where the V-1 and V-2 rockets used in World War II were developed.

He came to the United States in 1945 with a group of German scientists who came to this country to work on rocket and missile development.

Since 1950 he has worked at the Army Redstone Arsenal at Huntsville, Ala., and has been with the Army Ballistic Missile Agency since February 1956.

Dr. von Braun became an American citizen in April 1955.

In recent months he has captivated the public imagination of this country with his public statements about the importance of outer space, and his conviction that man can and will conquer it.

We are delighted to welcome you, Dr. von Braun, to this historic committee room and to this committee that is charged with the responsibility of maintaining a constant surveillance over our armed services and the state of our Nation's preparation.

As is customary with all witnesses who have appeared before this committee, we will ask you to stand and raise your right hand and take the oath.

Dr. von Braun, do you swear that the testimony you give this committee will be the truth, the whole truth, and nothing but the truth?

Dr. VON BRAUN. I do.

Senator JOHNSON. Mr. Weisl will proceed to examine the witness. But first we will insert Dr. von Braun's biography at this point in the record.

BIOGRAPHY OF DR. WERNHER VON BRAUN

Dr. Wernher von Braun is Director, Development Operations Division, Army Ballistic Missile Agency, Huntsville, Ala.

He was born March 23, 1912, in Wirsitz, Germany. He received his doctor degree in physics from the University of Berlin in 1934.

In 1930 he joined a group of inventors connected with the German Society for Space Travel. In 1932 he became connected with the German Ordnance Department. He was chief of a small, liquid-fueled rocket development station near Berlin from 1932 to 1937. Here the A-1, A-2, and A-3 rockets, forerunners of the V-2, were developed.

In 1937 he became technical director of the Peenemuende Rocket Center. He remained at Peenemuende until the closing months of World War II when he and his colleagues voluntarily decided to turn over their research information and valuable technical data to the West.

He came to the United States under contract with the United States Army Ordnance Corps in September 1945. He first worked on high altitude firings of captured V-2 rockets at the White Sands, N. Mex. Proving Ground. Later he became project director for a guided missile development unit at Fort Bliss, Tex. which employed many of his Peenemuende colleagues.

Since April 1950 he has been in Huntsville. He was in charge of guided missile development at Redstone Arsenal until he transferred to the newly activated Army Ballistic Missile Agency in February 1956.

He is affiliated with many scientific societies and has published numerous papers and books, many of them on space travel, and has assisted in the production of motion pictures on the same subject.

His present work is with the weaponization of the Redstone ballistic missile and the development of the Jupiter intermediate range ballistic missile. As such he directs the work of nine laboratories, a research projects office and a technical liaison office.

Dr. von Braun and many other former German scientists and their families became American citizens April 14, 1955, in Huntsville.

TESTIMONY OF DR. WERNHER VON BRAUN, DIRECTOR, DEVELOPMENT OPERATIONS DIVISION, ARMY BALLISTIC MISSILE AGENCY, HUNTSVILLE, ALA.

Mr. WEISL. Dr. von Braun, you are associated in the German use of the V-2.

Will you tell the committee briefly just what your association with the V-2 was?

Dr. VON BRAUN. Yes, sir.

The V-2 was the outgrowth of liquid fuel rocket developments that had been going on in Germany since 1930. In 1930, still as a student, I became associated with the German Society for Space Travel. We built some rather primitive liquid-fuel rockets under the auspices of this society.

Mr. WEISL. How old were you at that time, Doctor?

Dr. VON BRAUN. 18.

Mr. WEISL. Proceed.

Dr. VON BRAUN. In 1932, about 2 years later, the German Army became interested in our work, but was ready to support us only with the stipulation that we would move behind the fence of an army facility. This is how I became affiliated with the German Army.

Under the auspices of the army we first built two smaller liquid-fuel rockets, and by 1936 this project had progressed so well that the German Army, jointly with the German Air Force, decided to establish a rocket center on the Baltic Sea, which became the Rocket Center of Peenemuende, and it was there that the V-2 rocket was developed.

The actual development work on the V-2 began in early 1940.

The first flight tests were made in the spring of 1942, but were unsuccessful.

In October 1942, the first successful flight of the V-2 was made.

In September 1944, the V-2 went into military operation.

Mr. WEISL. Dr. von Braun, will you please tell the committee what lessons were learned from the operation of the V-2? I am now speaking of mobility, guidance, and such other lessons as were learned that are now applicable to the manufacture and use of missiles.

Dr. VON BRAUN. Sir, when it was decided to put the V-2 into military operation, it was still full of bugs, as we used to say in the rocket field. It was a brandnew weapon, a brandnew technology. Particularly, the engineers and scientists at Peenemuende, for whom I was speaking at the time as the technical director, we were of the opinion that a fixed base concept was the only feasible solution at that time to put this weapon quickly into operation. So we insisted on concrete pens under which the missiles could be prepared in a more or less laboratory type fashion. The missiles would only be wheeled out to the launching site a few minutes prior to the launching.

The military at the time told us continuously that it was a hopeless undertaking to build and to operate such concrete pens, such fixed installations, in view of the unchallenged Allied air superiority in that area.

So the military insisted on mobility, while I myself, along with my technical associates, were utterly skeptical that the V-2 was sufficiently advanced for mobile development.

Finally a compromise was reached. A few of these pens were actually built while we also continued pursuing the mobile concept.

ALL MOBILE PLATFORMS ESCAPED DESTRUCTION

The net result was that all the pens were completely destroyed before they were ever put in operation, and that not a single V-2 missile was ever lost at a mobile launching site—and this despite the fact there was a 30-to-1 air superiority by the United States Air Force, along, of course, with the Royal Air Force, in that area.

Mr. WEISL. In other words, the Royal Air Force and the American Air Force destroyed the static launching platforms, but most of the mobile platforms were saved?

Dr. VON BRAUN. All of them.

Mr. WEISL. All of them were saved?

Dr. VON BRAUN. Yes. A number of V-2's were lost during transportation on the roads and on railway trains, but there is not a single case on record where a V-2 was destroyed in a mobile launching site, and I believe with the V-1 missile they had exactly the same experience.

Mr. WEISL. From your experience in supervising the work on the Redstone missile and the Jupiter missile, you agree with General Gavin, I take it, that they are mobile?

Dr. VON BRAUN. Yes.

Mr. WEISL. And mobility should be the fundamental purpose in the use of those weapons?

Dr. VON BRAUN. Yes, sir. I am convinced of this. In the Redstone missile we have achieved complete mobility, not movability, but mobility, true mobility. With the Jupiter missile, such mobility can even easier be attained than with the Redstone, because the empty weight of the missile is less. The Jupiter is shorter and lighter than the Redstone.

Mr. WEISL. Dr. von Braun, will you tell the committee briefly how you managed to escape from the Russians as they were approaching Peenemuende?

Dr. VON BRAUN. By January 1945 the situation in Peenemuende was the following: The Russian Army was approaching from the east, it was about 100 or 80 miles from Peenemuende, so close that we could already hear the artillery fire at night.

It was very obvious to me and my associates that the war was lost, and that the decision whether we wanted to wind up on the east side or the west side had to be made now before the Russian Army arrived.

So I held a meeting, and we took a vote, and there was unanimous vote to the effect that we should go west.

Now, to implement this resolution was not quite that simple, because we were in the rear area of the fighting front, and there was much confusion going on.

Military agencies in our area had already moved out, due to the general air raid situation. For the same reason we had scattered many of our operations over the countryside. Also our development plant had been converted into a private corporation in the meantime. So I was pretty much on my own, and the directives we got from the various headquarters were utterly conflicting and confusing.

I remember we had about 10 different directives. About five said "You stay put right here and all you men will defend the Peenemuende

area whenever the Russian Army moves in"; and the other half of the directives said "Move out."

So we could take our pick. But the chances, or the risks, taken in either case were quite high, because all those directives were quite strongly worded.

We finally evacuated most of our equipment with the help of the Navy. We used those directives that told us to evacuate as a basis to issue ourselves passports through that rear army area, and with a little bluffing we fought our way through.

We finally wound up partly in central Germany and partly in Bavaria. There we were ultimately run over by the American Army.

Mr. WEISL. Were you able to escape to the American Army with equipment?

Dr. VON BRAUN. Yes, sir. We moved a total of 12,000 tons of equipment out of Peenemuende, but I would say only about 2,000 tons ever reached the American Army, because much of it was lost during the evacuation period.

We moved most of the heavy equipment with the aid of barges that were towed up the Elbe River, and there was much fighting going on. In fact, it was along the Elbe River that the American Army and the Red Army established contact, so there was much shelling going on, and many of the barges were sunk.

So only about 2,000 tons, but I would say the most important equipment, finally wound up in American hands, including the documents covering our scientific and engineering work.

Mr. WEISL. In other words, you delivered the equipment and documents and all the supporting data you could bring with you to the American Army?

Dr. VON BRAUN. That is right.

Mr. WEISL. Did many of the scientists and technologists of Germany go over to the Russian Army?

Dr. VON BRAUN. There was, of course, the V-2 production going on which involved a great number of component manufacturers all over Eastern and Western Germany, in addition to the assembly plant.

The Russians overran the assembly plant where they found lists of those component suppliers. All they had to do was to go back to the component suppliers. There they found many components for the V-2 production that were still in the pipelines, in various states of completion. With the help of this equipment and the personnel located at these plants, they got the V-2 production program started again.

Essentially they assembled a substantial number of missiles from what they found in the pipelines of production.

VON BRAUN DOES NOT ATTRIBUTE SOVIET SUCCESS TO GERMANS

Mr. WEISL. Dr. von Braun, the opinion prevails, to some extent, in many circles that the German scientists were responsible for the great success that Russia has achieved in the missile field. Do you share that opinion?

Dr. VON BRAUN. No; I do not.

Mr. WEISL. Were the German scientists that you talked to, or were informed of, who returned from Russia allowed even to see the

Russian missile plants or the Russian development centers for missile plants?

Dr. VON BRAUN. No, sir. I had the opportunity to read some reports on the German returnees from Russia. These reports, if I remember correctly, were written and circulated in the Department of Defense around 1954 and early 1955.

The story on the experience of those returnees from the Soviet Union ended in 1952 or early 1953, and these reports were essentially—these reports were what is called, in the intelligence lingo, “debriefings.” In other words, whenever a German rocket scientist came back from Russia and appeared either in Berlin or in West Germany, he was interrogated on what he had seen there. On the basis of these reports, I personally came to the conclusion that the Russians not only had made very poor use of the German talent they had taken along to Russia, but actually that there was a lot of mismanagement in their missile program. I came to the conclusion, which later on proved to be entirely erroneous, that the Russian program wasn’t very convincing, and not really dangerous.

I think Senator Symington will remember the discussion we had at that time. Senator Symington asked me, “How come you made a statement in public that you don’t think the Russians are ahead of us?” and I quoted my sources.

Shortly thereafter, I obtained my American citizenship. General Gavin then decided it was about time for me to get the real story, what we really knew about the Russian program. And then, I must say, my opinion changed completely. It became obvious to me that those Germans that had been taken to Russia not only were poorly used but they were actually left completely in the dark about the fact that there was a Russian program outside of their own operation, outside of the places to which they were assigned.

Mr. WEISL. Please tell the committee, Dr. von Braun, if you can, what the German scientists did in Russia, and what the Russians did themselves in developing missiles.

Dr. VON BRAUN. A very significant thing, for example, was that these debriefing reports contained requested statements that those German scientists weren’t even encouraged to learn Russian. So they wrote reports from memory on how they did this and this, in German, and they were told: “Don’t worry about the translation, we will take care of that.”

Some returnees mentioned that they found their own reports in Russian translation later on, in some files in Russia, with their own names omitted. Somebody else had simply signed the reports for them. So it was even hidden from the Russians that some of these papers were written by a German. But most of these reports were limited to the kind of thing “Tell us how you did this,” or “Tell us how you did that.” It was nothing constructive. It was only re-constructive.

Mr. WEISL. Is it your opinion, Dr. von Braun, that the Russians could have accomplished what they had, or what they do have in the way of missiles, without the Germans?

Dr. VON BRAUN. Sir, I would put it this way: When I say that I don’t believe that the German scientists had a hand in this Russian development, I do not necessarily mean that Russia did not base their missile development on, shall we say, the V-2 background. They certainly did that.

They found, as I mentioned before, the assembly plant; they found drawings, documentation, reports, copies of practically the whole scientific and technological missile archive, the report library that grew out of the V-2 program. I am convinced that the Russians took very great pains in evaluating every little bit of information that they found. They have a wonderful translation system, and a very efficient foreign source scientific evaluation system, so they certainly made full use of everything they found. But they definitely did not let the German scientists they took into Russia take part in their active missile development.

Mr. WEISL. You do not underestimate the ability of the Russians to make and develop and plan and research into the missile field; do you?

Dr. VON BRAUN. No, sir; I don't.

Mr. WEISL. Do you believe the Russians are ahead of us in this field?

Dr. VON BRAUN. In the ballistic missile and satellite business, definitely; yes, sir.

Mr. WEISL. Dr. von Braun, without going into too much detail, and without repeating the testimony of General Medaris which you, I believe, listened to, will you please tell the committee what impediments or bottlenecks or restraints there are in developing a missile program in the United States.

Dr. VON BRAUN. General Medaris mentioned quite a few of the daily problems that we have to cope with. For example, we received a decision to produce the Jupiter, but we don't get the funds to finance the production. We have to let a contract now, or rather several contracts, but that money hasn't been forthcoming yet.

This is a typical difficulty. I am convinced that some day the money will be coming, but in the meantime 6 valuable weeks have been lost.

Senator JOHNSON. I think this can stand some repetition, so you just follow the counsel's suggestion and tell this committee every impediment that you have encountered and, through this committee, tell the country.

IMPEDIMENTS TO THE MISSILE PROGRAM

Mr. WEISL. You have been associated with this program, Dr. von Braun, from the beginning. You started with the V-2, which you brought over here. From the V-2, you went to the Redstone. From the Redstone you went to the Jupiter, so that you know exactly what has happened, and you have told me in our interviews, point by point, what has stymied the development of this program, and everything that has delayed the development of the program, so let us take point by point, and tell this committee, and lay it on the line, just what has happened to stymie the development of this program.

Dr. VON BRAUN. Well, sir, at first, there was a period of approximately 6 years, between 1945 and 1951, where we did not work at the Redstone missile. We lived in Fort Bliss, Tex., at that time, and our main task was to support a scientific high-altitude research program, using V-2 rockets. In addition, we were given the task to develop a small, experimental missile, also based on the V-2, that was called Hermes II. I would say this was the maximum we could do with the

facilities we had. Hermes II was not even meant to be a weapons system. It was a kind of a long-range research vehicle, based on rockets and ram jets.

Mr. WEISL. Did you ask, during that period, for other facilities?

Dr. VON BRAUN. Well, sir, the entire operation at that time was on such a modest scale that it would have been entirely impossible to start a major program.

Mr. WEISL. Did you realize, from your experience, that this program was too modest to accomplish what was needed?

Dr. VON BRAUN. Well, sir, I am convinced that it takes time to build up momentum in technological developments. I am convinced that, had we continued our operations at Peenemunde with the same momentum that developed during the war, we could have produced an ICBM in 1950. But this, of course, is a very unrealistic way of looking at things. The war was over, and the general atmosphere in those postwar years was. "The war is over; let us utilize these interesting new toys that we imported from Europe, and let us put them to use for high-altitude research." There was not a single high-priority weapons program going on in the entire missile area at that time.

I am not trying to blame anybody by saying that. I thought it was entirely understandable. People were just happy that the war was over and that they could devote their efforts and their energies to something else.

Mr. WEISL. Yes, sir. Now, Dr. von Braun, when you did start making the intermediate missile, tell us what impediments you encountered.

Dr. VON BRAUN. In 1951, we began the Redstone missile. This program was initiated very strongly, promoted by the then Director for Guided Missiles, Mr. K. T. Keller. I would say, when he came in, things began to move.

Mr. WEISL. When was this?

Dr. VON BRAUN. This was in early 1951. Mr. Keller was the man who said, "Let's build an operational ballistic missile."

Mr. WEISL. What was his title; do you remember, Dr. von Braun?

Dr. VON BRAUN. Mr. Keller was president, and later chairman of the board, of the Chrysler Corporation.

Mr. WEISL. I mean what was his title in connection with guided missiles with the Government, if you know?

Dr. VON BRAUN. Director of Guided Missiles.

Mr. WEISL. And who brought him in?

Dr. VON BRAUN. The Department of Defense, the Secretary of Defense, whoever that was in 1951. I think Mr. Lovett.

Mr. WEISL. Was that Mr. Lovett?

Dr. VON BRAUN. I think so. Anyway, it was under the Truman administration.

Mr. WEISL. It was Mr. Lovett. Now, proceed, and tell us what obstacles, if any, you encountered right from the beginning and throughout the experience that you had.

Dr. VON BRAUN. Our work for Mr. Keller was most pleasant. I had the impression that he was a very competent and capable man.

Mr. WEISL. I am sure he was, but we are trying to find out what obstacles, if any, you encountered. We know that Mr. Keller was a competent, able, fine man.

Dr. VON BRAUN. I would say there were no obstacles. The difficulty was, while very little had been done for 6 years, all of a sudden money and resources, everything, was thrown at us, and now Mr. Keller was asking for the impossible all of a sudden.

Mr. WEISL. Tell us what happened, please.

Dr. VON BRAUN. Well, I remember that the first program schedule under which he wanted us to handle the Redstone was so ambitious, as far as getting production started, that we told him: "You had better go a little slower, because, if we start producing untested hardware at this scale, then a lot of that hardware will probably wind up on the junk pile. There will be so many modifications before it really works that we would be operating beyond the point of diminishing returns."

So, at our request, the program was then somewhat relaxed.

Mr. WEISL. In other words, you wanted to do research and development during that period?

Dr. VON BRAUN. No, sir. I would say we had done a lot of quiet research in those last 6 years, when there was no crash program. But Mr. Keller's ideas on the production buildup and how fast we could design and finish the Redstone missile were beyond our capabilities. We felt we needed more time to do it.

Mr. WEISL. You were talking about the Redstone missile?

Dr. VON BRAUN. I am talking about the Redstone missile in 1951.

Mr. WEISL. What was the range, or contemplated range, of the Redstone missile?

Dr. VON BRAUN. It was contemplated as a 175-nautical-mile missile right from the beginning.

Mr. WEISL. And when did you abandon the Redstone—or, rather, when did you go into the—

Dr. VON BRAUN. May I correct myself?

Mr. WEISL. Yes.

Dr. VON BRAUN. The history of the Redstone was a bit more involved. At first, we were asked to make studies of what range we could attain with a guided ballistic rocket, using rocket engines available in this country. The payload weight that we were told to consider in these calculations was less than what the Redstone now carries. Thus, the first studies envisioned a missile of something like 400- or 500-mile range, but, when the details were worked out and our program was finally coordinated with the AEC warhead program, it was decided to use a heavier warhead. This reduced the range substantially, and this is how we finally wound up with the 175-nautical-mile range.

Mr. WEISL. When did you go into the Jupiter missile field?

Dr. VON BRAUN. We made paper studies for the Jupiter during the summer of 1955. The green light was given around December 1955, if I remember correctly. In February 1956, the Ballistic Missile Agency was established under General Medaris' command.

Mr. WEISL. And will you tell us what obstacles or bottlenecks or difficulties, if any, you encountered?

Dr. VON BRAUN. I would say at first things were going very smoothly. We had everything we asked for, and it was only after about a year or so that—how shall I express myself—that the termites got into the system.

Senator JOHNSON. The what?

Mr. VON BRAUN. The termites.

Senator JOHNSON. Termites.

Dr. VON BRAUN. As General Medaris mentioned before, the money was allocated, but somebody withheld it, and we got only part of it.

Senator JOHNSON. When did the termites come?

Dr. VON BRAUN. I would say we had clear sailing for about a year.

Senator JOHNSON. When did the termites come?

Dr. VON BRAUN. The difficulty began when the roles and missions assignment for the IRBM was given to the Air Force, and more and more people doubted whether the Jupiter would really go into production, and, so, people were withholding final approval.

Mr. WEISL. Tell us what happened, please, Dr. von Braun. Did you have difficulty getting money, the money that you needed?

Dr. VON BRAUN. Yes, sir.

Mr. WEISL. Did you have difficulty in getting the money on time?

Dr. VON BRAUN. Yes.

Senator JOHNSON. Get that date; that is what I want. About what time, what month, and what year, that the termites got there.

Dr. VON BRAUN. I would say it began about November 1956, that difficulties began.

Senator JOHNSON. November 1956?

Dr. VON BRAUN. Yes, sir.

Mr. WEISL. Now, tell us what those difficulties were, beginning in November 1956, point by point. Take your time, Doctor.

JUPITER PRODUCTION UNFUNDED AS YET

Dr. VON BRAUN. You can save time in our arsenal-prime contractor concept when you phase in the prime contractor as early as possible, when you give the prime contractor time to work along with the developer, to start building his tools.

Now, in view of the fact that nobody knew for sure whether the Jupiter would ultimately be selected for production, there was this continuous delay. People would say, "Now, let's wait until that committee comes next week that will make a final recommendation, and if that recommendation is favorable you will get the money." And then the committee would make a recommendation, but as the result of that recommendation still no decision was made, and so the thing just dragged on. Up to this very moment, we haven't got the money for the Jupiter production yet.

Mr. WEISL. Before you go into production, you have to pass the feasibility and development stage, and that is important because, unless you pass that stage, you can't go into production?

Dr. VON BRAUN. This is right, Mr. Weisl.

Mr. WEISL. Did you have any difficulty in the development and feasibility stage? In other words, Jupiter is not in production now?

Dr. VON BRAUN. No; I would say in this area, we actually—

Mr. WEISL. Tell us what difficulty, if any, you had in passing the development stage, the feasibility stage, and the research stage.

Dr. VON BRAUN. Sir, I would say our development actually came along even better and smoother than we had expected. Our records show the number of missiles we predicted in January 1957 we would fire during 1957.

Mr. WEISL. I know it was better than you expected, but tell me—

Dr. VON BRAUN. We fired two more than we had expected we could.

Mr. WEISL. You fired more than you expected?

Did you have any difficulty in getting this program going?

Dr. VON BRAUN. No, sir.

Mr. WEISL. Did you get decisions in the Defense Department quickly?

Dr. VON BRAUN. No, sir; I would say the difficulties were not in the research and development area. The difficulty was that you must get production started, even if you are still in the research and development phase, because you have long lead-time problems in certain areas.

For example, production and acceptance test facilities must be modified, and if you get approval for this kind of thing only after you have demonstrated that the weapon works, then you lost time. This is the area where we had the greatest difficulties.

Mr. WEISL. Tell the committee, please, in what respect you lost time.

Dr. VON BRAUN. Well, we could be much further ahead today at the Chrysler Corp. with the tooling for the Jupiter, had General Medaris been told half a year ago that Jupiter will definitely go into production, and that Chrysler is definitely the contractor.

Mr. WEISL. You weren't told that Chrysler would go into production as the contractor; is that it?

Dr. VON BRAUN. It wasn't even clear whether the Jupiter was to go into production.

Mr. WEISL. But you were working on it, looking toward the time when it would go into production, weren't you?

Dr. VON BRAUN. We were; yes.

Mr. WEISL. You were testing it?

Dr. VON BRAUN. Yes.

Mr. WEISL. You were making the hardware in prototype fashion?

Dr. VON BRAUN. Yes.

Mr. WEISL. You were working on the propulsion system; you had contractors working on the guidance system; you were doing research with scientists. Did you have any difficulty? Was your work impeded?

Dr. VON BRAUN. Not in this area, but there would have been——

Mr. WEISL. In what area was it impeded? Please tell the committee in what area it was impeded, if any.

Dr. VON BRAUN. It was impeded because due to this delay in the production decision it could be clearly foreseen that there would be a gap between the development, research and testing phase and the actual production. And therefore availability of the Jupiter missile in the field would be delayed.

Mr. WEISL. Did you go to the Pentagon and ask for decisions?

Dr. VON BRAUN. General Medaris did, once a week.

Mr. WEISL. How often did you go?

Dr. VON BRAUN. Twice a month.

Mr. WEISL. Why was it necessary for General Medaris, who was working to get these missiles done, to go from Alabama to Washington once a week, and for you, his Chief Director to go twice a month? You told me why before. Now tell the committee why, Dr. von Braun.

Dr. VON BRAUN. For example, I had to go quite frequently because there were committee hearings here in Washington, not hearings like this here, mind you, but technical and scientific committee hearings. I had to justify very often why we were doing things this way and not that way, and why the Air Force does it this way, and why we think that way is better, and so forth, and this, of course, cost much of my time.

Mr. WEISL. Were these committee hearings constructive for you?

Dr. VON BRAUN. Sir, I think we have too many committees in this area. I believe that scientific and technical committees made a very fine contribution early in the missile business, for example in arriving at decisions on what should be done in the ICBM area.

Mr. WEISL. Dr. von Braun, may I help you a little, please. When you and I talked in the Pentagon, you told me that one of your chief difficulties was your inability to ever get a decision from the Defense Department; is that true?

Dr. VON BRAUN. That is right, sir.

Mr. WEISL. Please tell the committee about that. We know that some committees are necessary. We know that fine men serve on those committees, but we want to know what impeded you from doing your work quickly.

Dr. VON BRAUN. Sir, I think there is a difference between a committee that evaluates something and a committee that continuously interferes with executive operations.

Mr. WEISL. Were you continuously interfered with?

Dr. VON BRAUN. Yes, sir. The mechanism in the Pentagon works something like this: Attached to every Assistant Secretary or Director for Missiles or whoever it is, on practically every level, there is an advisory committee advising that particular Assistant Secretary on what is right and what is wrong. And since that man wouldn't make a decision without advice from his committee, you can't bypass the committees.

Mr. WEISL. Was this system of the Secretary going to the committee, and then you justifying yourself to the committee impeding you in your work?

Dr. VON BRAUN. Yes; definitely. We were very often confronted with the fact that a decision on this or that question wouldn't be made before a certain committee had a chance to talk to you or listen to you, and make its final report.

Mr. WEISL. Did that committee consist of experts in the missile field?

Dr. VON BRAUN. Well, sir, put it this way: Most people that have real practical experience with missiles are busy building missiles these days, and since men actively engaged in missile projects are not eligible to serve on these committees—

Mr. WEISL. Dr. von Braun, you told me, did you not, and I do not know why you hesitate in this hearing, because we have had several talks, that while the men on these committees were fine men in certain fields, they did not know a thing about missile production.

Dr. VON BRAUN. I did not express myself that harshly, Mr. Weisl. [Laughter.]

Mr. WEISL. Well, tell us how you did express yourself, Doctor.

Dr. VON BRAUN. Many, I would say the great majority, of the gentlemen serving with these committees are brilliant scientists and ex-

perts in their particular fields. But the missile business, particularly once a missile project really gets going, involves many questions which are, I would say, nonscientific in nature; they have something to do with project management or time schedules.

For example, a physics professor may know a lot about the upper atmosphere, but when it comes to making a sound appraisal of what missile schedule is sound and how you can phase a research and development program into industrial production, he is pretty much at a loss.

Senator JOHNSON. Doctor, is it fair to say that the problem you found is that you have got too many committee advisers advising the advisers?

Dr. VON BRAUN. Yes, sir; I would say these committees should have their place. They should evaluate programs, and should help screen programs; they should screen technical suggestions as to their soundness of approach. But when it comes to running projects, there should be more executive power, there should be a strong project management; and once it has been decided to do something in a certain fashion, the project manager should be boss.

Mr. WEISL. Now, you told me of these committees in the Pentagon, and that you saw them twice a month yourself?

Dr. VON BRAUN. I said I went to Washington twice a month, but not only to see committees. But the committees took a very substantial portion of these visits.

Mr. WEISL. All right. General Medaris had to come approximately once a week to meet these committees?

Dr. VON BRAUN. Not the committees, but also other people, to pry the money loose.

Mr. WEISL. To meet somebody to pry the money loose and to get decisions?

Dr. VON BRAUN. Yes, sir.

Mr. WEISL. And then some committees came out to monitor you; did they not?

Dr. VON BRAUN. Yes, sir.

Mr. WEISL. How many committees would come out to monitor your work?

Dr. VON BRAUN. Well, how many do we have? Five, maybe.

Mr. WEISL. At Huntsville?

Dr. VON BRAUN. Yes. Sometimes a committee does not come together, as a group, but single members of the committees come visiting.

Mr. WEISL. Well, how many times did the committees or members of the committees come to Huntsville to monitor your work?

Senator JOHNSON. We are talking about the Defense Department?

Mr. WEISL. From the Defense Department.

COMMITTEES CONSTANTLY VISITED INSTALLATION

Dr. VON BRAUN. I think our visitors' record would show there has not been a week in the last 2 years that some members of a committee have not been visiting our installation.

Senator JOHNSON. A committee a week?

Dr. VON BRAUN. At least one committee member a week has been visiting our installation.

Senator JOHNSON. A representative of some Defense Department committee has been monitoring you once a week for the last year?

Dr. VON BRAUN. Yes, sir. Individuals, individual members of these committees. They would come to get from us "a little background information for my work for the committee."

Mr. WEISL. Did they help you in your work?

Dr. VON BRAUN. I would say sometimes these discussions are very interesting. [Laughter.]

Mr. WEISL. I am not talking about whether they are interesting. You told me that you were monitored by committees and members of the committees, both at Huntsville and in the Pentagon, by people who were fine men in their field, but knew very little about the missiles that you were working on; is that true or not true?

Dr. VON BRAUN. Yes, sir, that is true; that is true.

Mr. WEISL. And that impeded you in your work, did it not?

Dr. VON BRAUN. Yes, sir; and I would say it impedes probably other missile projects also.

Let me make one thing very clear. I think these committees have their place at the beginning of new missile projects. But once the word "go" has been given and the general design has been agreed upon then these committees should yield the executive power to the people who run the project.

Senator JOHNSON. Did it seriously interfere with your work?

Dr. VON BRAUN. Yes, sir; it did.

Senator JOHNSON. Would it seriously interfere with your work if the committees did not visit you once a week?

Dr. VON BRAUN. Yes, it did.

Mr. WEISL. You mean it did seriously interfere with your work by having the committees visit you once a week?

Dr. VON BRAUN. Yes, sir; it did.

Senator JOHNSON. Would it hurt you if they cut them off now and stopped them from coming?

Dr. VON BRAUN. Sir, the important thing is not that the visits bother us, but the fact that you cannot get a decision out of the Pentagon before these committees have made their recommendations at the various levels of the Pentagon.

Mr. WEISL. In other words, the committees come out to see you or one member of the committee——

Dr. VON BRAUN. Yes, sir.

Mr. WEISL. And often these members do not know anything about missiles?

Dr. VON BRAUN. Sir, I didn't say that.

Mr. WEISL. Sir?

Dr. VON BRAUN. I did not say that.

Mr. WEISL. What did you say?

Dr. VON BRAUN. I did not mean it, either. [Laughter.] I think that there is a difference between being a scientist and expert in a certain area who can express his professional, scientific opinion on a scientific problem, and being able to appraise a missile program as a whole.

I believe an established missile program, like the Jupiter, has much more similarity with an industrial planning job than with a scientific project.

THE PROBLEM IS LARGELY ENGINEERING

Mr. WEISL. May I ask you this, Dr. von Braun: Your job in building the Jupiter and developing it was not a scientific problem but an engineering problem; is that right?

Dr. VON BRAUN. I would say it was 90 percent engineering and 10 percent scientific, and in these scientific areas we love scientific advice.

Mr. WEISL. And the scientists who came out to see you were not engineers?

Dr. VON BRAUN. That is right.

Mr. WEISL. They were scientists?

Dr. VON BRAUN. That is right.

Mr. WEISL. And they did not help you, did they?

Well, tell us frankly, Doctor, as you told me.

Dr. VON BRAUN. Sir, there are many areas where we even go to them and ask for their advice, but I think to expect a scientist to have all the answers to everything—my personal feeling, to be frank about this, is as follows: I believe that the prestige factor plays a very important part in these things. When confronted with a difficult decision involving several hundred million dollars, and of vital importance to the national defense, many Pentagon executives like to protect themselves. It helps if a man can say, "I have on my advisory committee some Nobel prizewinners, or some very famous people that everybody knows." And if these famous people then sign a final recommendation, the executive feels, "Now, if something goes wrong, nobody can blame me for not having asked the smartest men in the country what they think about this."

Mr. WEISL. But, when you are trying to get a missile developed and in operation, you do not want to be protected by asking smart scientists about it, do you?

Dr. VON BRAUN. No; I think, in the last analysis, somebody has to stick his neck out anyway.

Senator JOHNSON. Did you get any help from any of these visiting committeemen? Did they contribute anything to the job you were doing?

Dr. VON BRAUN. Yes, sir; they did. But in detailed areas, not in the overall plan of the project.

Mr. WEISL. Who sent these scientists down there to Huntsville? Did you ask for them?

Dr. VON BRAUN. No, sir. The way——

Mr. WEISL. Who sent them down?

Dr. VON BRAUN. The way it goes, we get a piece of paper saying that a new committee has been established, and will come to visit us. [Laughter.]

Mr. WEISL. How would you run this project? Let us try to get at it this way: You are assigned with the responsibility of this project under General Medaris. Now, tell the committee, as you told us, how you would run it.

Dr. VON BRAUN. I feel it is very helpful to have scientific advisers——

Mr. WEISL. You have already made the point it is helpful to have scientists.

Dr. VON BRAUN. It is helpful to have a scientific advisory committee at a time when you kick the question around whether a certain

proposal is sound or desirable and in the country's interest and whether the performance promises made are sound, and so forth.

But, once the committee has made a recommendation to go ahead with a certain proposal and it has become an established project, then the project manager, like General Medaris here, should be put on the job. He should be asked: "How much money do you need, and what is your time schedule?" And from then on, he should have a free hand; he should have unquestioned Pentagon support and, from then on, this committee recommendation business should stop.

Mr. WEISL. Did the interference stop from then on?

Dr. VON BRAUN. As I said before, we had clear sailing for a year. After 1 year, after this question came up, "Will the Jupiter go into production or not?" we didn't get the necessary decisions from the Pentagon.

Senator JOHNSON. You have got the decision now to go full steam ahead on it.

Dr. VON BRAUN. But we still don't have the production money.

Senator JOHNSON. I am asking you; but you have permission to go full steam ahead with the Jupiter?

Dr. VON BRAUN. Yes, sir.

Senator JOHNSON. But you do not have the money?

Dr. VON BRAUN. We don't have the money.

Senator JOHNSON. How can you do it, then, without the money?

Dr. VON BRAUN. That is a good question, sir. [Laughter.]

Senator JOHNSON. Then give me a good answer.

Dr. VON BRAUN. I do not know.

Senator JOHNSON. That is a good answer. [Laughter.]

Senator JOHNSON. Go ahead and talk to any of your associates; there is no hurry. Go ahead and talk to them. You have a decision here to go ahead now, and the country has been told that we are in high gear, we are going full steam ahead with no holds barred, all out. But you have received no money. Is that what you are saying?

Dr. VON BRAUN. Yes, sir. General Medaris will be in a position to answer that question, probably, much better than I.

Mr. WEISL. You heard him answer it; you were here, weren't you, Doctor, when he answered it? Didn't he tell you Congress would appropriate the money?

Dr. VON BRAUN. Yes, sir.

Mr. WEISL. Then the Defense Department, either the Controller or the Budget Director, would not allocate it to you; is that right?

Dr. VON BRAUN. Right now, we have a request in for the procurement of Jupiter missiles; I mean production—

Mr. WEISL. Yes.

Dr. VON BRAUN (continuing). And that money isn't there, so the contract can't be let. That is the situation.

Senator JOHNSON. How long has that request been in?

Dr. VON BRAUN. I think the request was made about 6 weeks ago.

Mr. WEISL. You sit with him, General Medaris, and you can help him out, because I am afraid I might be asking the questions a little more—in a difficult manner for you, Dr. von Braun.

General MEDARIS. The problem is, gentlemen, if I might interject a second, that Dr. von Braun is the technical director of the project; the project manager is myself. He knows, by constant conference with me, what the situation is. But the handling of these very diffi-

cult, shall we say, administrative and financial problems, is, thank God, not put on his shoulders. I don't let it get on his shoulders; so this is just to put it in the frame of reference.

Mr. WEISL. Dr. von Braun, you are the technical director of this project. What difficulties have you encountered as the technical director?

Dr. VON BRAUN. Well, sir, in this particular area, of course, it is difficult to act without the money, and I think General Medaris has not denied the effect.

Senator JOHNSON. Has General Medaris the money, and is he withholding it from you? Why didn't he give it to you? He says the financial responsibility is not on your shoulders. Where is the money?

Dr. VON BRAUN. I think what General Medaris meant is it is not my job to try to pry the money loose in Washington.

Senator JOHNSON. I understand that. But it is somebody's job to get the money, and you do not have it. Is that right?

Dr. VON BRAUN. Yes.

Senator JOHNSON. And General Medaris does not have it; isn't that right?

Dr. VON BRAUN. In the case of the Jupiter production, the fact is the money is not there.

PRODUCTION FUNDED WITH RESEARCH MONEY

General MEDARIS. Mr. Chairman, you embarrass me. I haven't got the production money, but I have borrowed some money from the research and development program to get the production underway.

Mr. WEISL. Dr. von Braun, how many Assistant Secretaries for Defense have you seen in the last 6 months?

Dr. VON BRAUN. In the last 6 months?

Mr. WEISL. In the last year, say. How often have you been to the Pentagon in the last year?

Dr. VON BRAUN. In the last year? Twenty times, maybe.

Mr. WEISL. Twenty times.

Dr. VON BRAUN. It would be about that.

Mr. WEISL. General Medaris is the director of the project, and you are working under him?

Dr. VON BRAUN. Yes, sir.

Mr. WEISL. And he went approximately once a week, and you had to come 20 times in the last year. Why did you have to come 20 times?

Dr. VON BRAUN. Maybe it was only 12 times.

Mr. WEISL. Or, say, 12 times. Why did you have to come 12 times?

Dr. VON BRAUN. Well, one of the reasons I gave you was these committee appearances.

Mr. WEISL. And you were called before the committee?

Dr. VON BRAUN. These were technical committee meetings.

Mr. WEISL. What type of capability was there on these committees? Who were they—engineers, missile producers?

Dr. VON BRAUN. No, sir. These committees usually consist of, shall we say, physics professors, men in the academic field.

Mr. WEISL. Take a physics professor. Did you have any problem of physics connected with the production of the missile?

Dr. VON BRAUN. Well, for example, in the guidance area, there are certain problems of physics. The way these meetings go, for example, someone would ask: "You tell us all about the guidance system and what makes you believe you can hit that accurately." Then we have to present an accuracy analysis of the guidance system, and there are questions asked, whether the assumptions are sound, and so forth.

Mr. WEISL. Do you agree with General Medaris that a project ought to be financed from the beginning so that you know where the money is coming from?

Dr. VON BRAUN. Absolutely.

Mr. WEISL. That is absolutely necessary to finish the project?

Dr. VON BRAUN. Yes, sir.

Mr. WEISL. What is the procedure now? How is the money allocated to you? When you go to General Medaris and say, "I need so much money to get this facility or to perform this work," what happens?

Dr. VON BRAUN. What we do on the technical end is that we first list our requirements. For example, if there are facility requirements, say, a laboratory must be expanded or we need a little more floor space in a shop, we present this to General Medaris, and General Medaris handles the rest of it. He requests the money.

Mr. WEISL. Do you get it as soon as you need it?

Dr. VON BRAUN. No; definitely not.

Mr. WEISL. Should the budget be on a yearly basis?

Dr. VON BRAUN. I think that, basically, there is nothing wrong with yearly budgeting, provided one can really see a year ahead and knows what comes.

Mr. WEISL. Can you see a year ahead, under the present system?

Dr. VON BRAUN. No; right now, we cannot.

Mr. WEISL. So that, because you cannot see a year ahead under the present system, your work is impeded?

Dr. VON BRAUN. Yes, sir.

Mr. WEISL. Do you take sufficient risks in order to get your work done, or are you permitted to take sufficient risks in order to get the project done under you?

Dr. VON BRAUN. Well, sir; this risk that General Medaris mentioned that he himself took, namely, by putting research and development money into the Jupiter production contract simply because the production money isn't there, that is a very typical case of how these difficulties must be ducked.

Mr. WEISL. You do believe there are too many committees, don't you, that you have to see?

Dr. VON BRAUN. Yes, sir.

Mr. WEISL. You make a positive statement about that?

Dr. VON BRAUN. Yes.

Mr. WEISL. You would be better off without these committees, would you not?

Dr. VON BRAUN. I would say the committees are good at the beginning, but they should be left out of the programs after the program got rolling.

Mr. WEISL. But they are not left out of the program after it gets rolling, are they?

Dr. VON BRAUN. No, sir.

Mr. WEISL. So, you would say one of the difficulties is too many committees after the program gets rolling?

Dr. VON BRAUN. Yes, sir.

Mr. WEISL. And that interferes with your work?

Dr. VON BRAUN. Yes, sir.

Mr. WEISL. And stymies the time element?

Dr. VON BRAUN. Yes, sir.

Mr. WEISL. Is there too great a turnover in civilian personnel in the Pentagon, in your opinion?

Dr. VON BRAUN. Well, sir, it would, of course, help if, in these difficult scientific and technological areas, the key personalities would stay longer and have a longer time of really becoming familiar with the problems. I mean——

Mr. WEISL. In other words, you told me that when one man gets acquainted with your problem——

Dr. VON BRAUN. He usually leaves.

Mr. WEISL (continuing). And when you try to carry out his recommendation, a new man comes in and changes it.

Dr. VON BRAUN. Yes; that is about it.

Mr. WEISL. Now, is there a failure by the Government or by the Defense Department to provide for research as you are developing the Jupiter? You told me that you needed money for research concurrently with the development of the Jupiter, and that you cannot get that money.

Dr. VON BRAUN. This is a very fundamental and, I think, a very serious question; the way all these programs in the Army and the Air Force, also in the Navy, are run. The trouble is you get the priority assignment for a limited end item which, for example, is called the Jupiter missile.

PROJECT MUST BE JUSTIFIED AS PRESENTLY USEFUL

But that in itself is a dead-end street, because there will always be something thereafter. It is very significant, for example, that the development of those large rocket engines that were discussed earlier in this hearing was not approved by anybody simply because there is no need for these engines within the framework of the existing and approved missile systems.

The question is asked, very simply: "Do we need it for the Atlas?" Answer: "No." "Do we need it for the Titan?" "No." "For the Jupiter?" "No." "For the Thor?" "No." Consequently, there is no need for a big engine.

Mr. WEISL. In other words, you agree with General Medaris there is need for an engine with a large thrust?

Dr. VON BRAUN. Yes, sir.

Mr. WEISL. And that unless we get that type of engine we might be behind the Russians in the ICBM field; is that your belief?

Dr. VON BRAUN. Sir, I wouldn't say in the ICBM field, but in the general field of control of outer space.

Mr. WEISL. Now, have you joined with General Medaris in that viewpoint and talked about it publicly——

Dr. VON BRAUN. Yes.

Mr. WEISL. And presented it whenever you could present it, to whomever you could present it?

Dr. VON BRAUN. Yes, sir.

Mr. WEISL. Has anything been done about developing that kind of an engine?

Dr. VON BRAUN. In this area, too, there was a committee appointed—laughter—by the Secretary of Defense that spent a whole day with us, and I think their recommendation was quite favorable. I think they gave a favorable report, or at least they endorsed the general idea for a big engine, I don't remember the details.

Mr. WEISL. What was the name of this committee? Do you remember?

Dr. VON BRAUN. It was called the Silverstein Committee. It was headed by Dr. Abe Silverstein, of the NACA laboratories in Cleveland.

Mr. WEISL. Is that the same Mr. Silverstein who wrote us a letter saying it was impossible to get through any long-term research project?

Dr. VON BRAUN. Yes, sir.

Mr. WEISL. And he recommended, I presume, as head of such a committee, that such an engine be developed?

Dr. VON BRAUN. Yes, sir.

Mr. WEISL. Was his recommendation followed?

Dr. VON BRAUN. No, no.

Mr. WEISL. Why not? Do you know?

Dr. VON BRAUN. I presume it was dropped along with other things due to budget considerations.

Mr. WEISL. Was there another committee to pass upon the Silverstein Committee appointed?

Dr. VON BRAUN. I don't know.

Mr. WEISL. Do you know, General Medaris?

General MEDARIS. I don't believe there was above that.

Mr. WEISL. What happened to the Silverstein Committee recommendation?

General MEDARIS. It disappeared in the Department of Defense. [Laughter.]

Mr. WEISL. But that was a very vital and crucial matter, in your opinion, was it not?

Dr. VON BRAUN. Yes, sir.

Mr. WEISL. Was it not, General Medaris?

General MEDARIS. Yes, sir. Very vital.

Mr. WEISL. And was it presented in a vital and crucial way?

General MEDARIS. We so presented it to the committee.

Mr. WEISL. Did the committee so regard it as vital and crucial?

General MEDARIS. Their recommendation was quite factual. I think the committee could get the text from the Silverstein Committee report.

Mr. WEISL. But so far as you know, nothing was done about that committee report?

General MEDARIS. That is correct.

Dr. VON BRAUN. Sir, may I add a few words?

Mr. WEISL. Just a few.

Dr. VON BRAUN. I think the reason why we never got anywhere in this large engine business is the following: the tendency for warheads, for atomic warheads, is to become lighter and lighter, lighter than they are now.

Mr. WEISL. Do you think we ought to go into this in open hearing?
 Dr. VON BRAUN. I think what I am going to say here I can say in open hearing.

Mr. WEISL. All right.

Dr. VON BRAUN. I will limit myself to what I can say in open hearing.

As the warheads will get lighter, many people feel there is no trend in the ICBM area, no foreseeable trend, to build larger ICBM's in the future. The same goes for IRBM's. The Polaris, for example, is a smaller missile than the Jupiter, mainly because it has a lighter warhead. And so many people feel there is no need for a big rocket engine, because the trend is down and not up in size and weight of these long-range missiles.

Now, I think this is where the crux of the whole matter lies. Up to this point the reasoning is correct, and I agree with it.

But if you want to establish control of outer space in the broader sense of the word, not just by ICBM's but, for example, by manned vehicles capable of going into outer space, you still need those large and powerful engines. However, for these manned vehicles there is no official requirement yet, and so——

CONTROL OF OUTER SPACE AS IMPORTANT AS ICBM

Mr. WEISL. And you join with General Medaris in feeling that the control of outer space and, I might say, with General Gavin, that the control of outer space is just as important, if not more so, than the development of the ballistic missile?

Dr. VON BRAUN. Sir, I believe that——

Mr. WEISL. You join in that belief?

Dr. VON BRAUN. Yes, sir; I do. I believe there is no question that right now the IRBM and the ICBM are very important, but I am convinced that the Russian concept, as demonstrated by Sputnik No. 2 carrying this animal, is clearly much broader. They consider the control of space around the earth very much like, shall we say, the great maritime powers considered the control of the seas, in the 16th through the 18th century, and they say, "If we want to control this planet, we have to control the space around it."

Mr. WEISL. Then we will discuss outer space with you this afternoon, Dr. von Braun.

Dr. VON BRAUN. Yes, sir.

Senator JOHNSON. Dr. von Braun, we have run over our lunch period, and we will take a recess now until 2:30.

The committee will stand in recess until 2:30.

(Whereupon, at 1:50 p. m. a recess was taken until 2:30 p. m. that same day.)

AFTERNOON SESSION

Present: Senators Johnson, Stennis, Symington, Saltonstall, and Flanders.

Also present: Senator Carl Hayden and Senator Alexander Wiley.

Senator JOHNSON. When the committee recessed, counsel was questioning the witness, Dr. von Braun.

Dr. von Braun, we will resume with your testimony. We are pleased to have you. If counsel is ready, we will resume with the questioning.

The committee is glad to welcome to our deliberations the distinguished former chairman of the Foreign Relations Committee of the Senate, the senior senator from Wisconsin, and we want you to feel free, Senator Wiley, to ask any questions when it comes around to your turn.

Senator WILEY. Thank you.

Senator JOHNSON. Mr. Counsel, will you proceed with the witness.

TESTIMONY OF WERNHER VON BRAUN—Resumed

Mr. WEISL. Dr. von Braun, I tried to base my questions on the interviews that you and I have had together and on the public statements you have made and the articles you have written. I perhaps asked you questions that I should not have asked, that should have been asked of General Medaris. So do not hesitate if I ask you a question that you do not think is in your field, to tell me that you cannot answer it.

Summarizing, Dr. von Braun, will you please tell the committee in your own words what you believe and what your experience has indicated are the impediments or obstructions to the successful prosecution of your duties at Huntsville?

Dr. VON BRAUN. I think the most important problem is to put our missile program on an even keel, that we take this hot and cold blowing out of our operations. I mentioned before lunch that it was the holdup in the budgetary end that was actually delaying things, and, of course, I have nothing to do with the getting of the money, but the lack of it still affects me very greatly and directly.

We can see in the Jupiter program quite clearly how this mechanism works. Getting production of a new missile started, even if that missile is still under development, involves long lead time. In other words, you have to order material and tooling for production, and you have to prepare facilities long, long before the missile itself is ready to go.

Now, the fact that there was no decision to really produce the Jupiter and go ahead with all this meant that for months and months nothing was done in this area. Now that we have the decision, after sputnik, we are told to provide a certain number of Jupiter missiles by the end of 1958 which can be sent overseas. But since many valuable months have been lost in preparing the production facility, we as developers now have to pitch in and make up for the lost time. This means that we have to work our people overtime, we have to take them away from more important research and development work that they should be doing, and they have to fill the gap of missing long lead time items. Of course, in a development plant like ours, the lead times are shorter, and with our own methods we just have to make up for the missing missiles and missile components which cannot be supplied in time by the prime contractor.

That is how it affects me and our own operations in Huntsville. Only with a superhuman effort on the part of us developers is it possible to still make the schedule. But the fact remains that this was not necessary, and it hurts. Somebody has to pay the piper in all these things.

Mr. WEISL. And it is absolutely necessary for you to work overtime?

Dr. VON BRAUN. Yes, sir, not only overtime but Saturdays and Sundays, too. This kind of thing is pretty rough on people, and par-

ticularly in the research and development area where you expect people to make creative contributions. It is, in my opinion, very poor economy and poor management to compel these people to supply hardware which could have been supplied by a contractor, had you given him a little more lead time and had the production money been pried loose a little earlier.

Mr. WEISL. In other words, Dr. von Braun, if I understand correctly, in making up this loss of lead time that you should not have lost if proper decisions had been made in time, you have to use your creative talent?

Dr. VON BRAUN. Precisely.

Mr. WEISL. To make hardware?

Dr. VON BRAUN. Precisely.

Mr. WEISL. Instead of working on creative matters?

Dr. VON BRAUN. Precisely.

Mr. WEISL. And in making up this lost lead time, do you not also lose time in making and preparing new weapons and new concepts?

Dr. VON BRAUN. Yes, sir. This team could do more important work if we would not have to pitch in now to prepare Jupiter hardware just because the production was not started early enough.

Mr. WEISL. Now that the announcement has been made that you are expected to produce a squadron of missiles at a certain time, have you got the decision necessary to do that now?

Dr. VON BRAUN. I think I mentioned that we have the decision, but since the money still—

Mr. WEISL. I mean have you get the decision implemented so that you can go ahead?

Dr. VON BRAUN. Sir, once we have the money, we can ask our contractor, Chrysler, what his delivery schedules will be, and if the schedules do not meet the operational requirements, then we have to make up the balance. So every day we get the money later will mean that we will have to put more work into Huntsville, into our development operations, to make up for the lost time. That is essentially what it adds up to.

VON BRAUN'S WARNING AGAINST COMPLACENCY

Mr. WEISL. Dr. von Braun, in reading many of the fine articles that you have written and the very enlightening and important statements that you made, I found that you made the following statement, and I quote it, and you correct it if it is not quoted correctly:

Anyone who is overly optimistic today, who says that everything is going to be hotsy-totsy, is doing a great disservice to the country.

Did you make that statement on November 7, 1957?

Dr. VON BRAUN. Yes, sir.

Mr. WEISL. You believe that, do you not?

Dr. VON BRAUN. Yes, sir; I think it is just as valid today as it was then.

Mr. WEISL. Your commanding officer at Peenemuende was Dr. Dornberger, was he not?

Dr. VON BRAUN. That is right.

Mr. WEISL. He was a general?

Dr. VON BRAUN. Yes.

Mr. WEISL. He made the following statement on November 7, 1957, quoted in the same newspaper from which I read your statement:

There can be absolutely no doubt now that the U. S. S. R. has the means for sending an atomic or hydrogen warhead anywhere in the world.

Do you agree with the statement?

Dr. VON BRAUN. Yes, sir.

Senator SALTONSTALL. Who said that?

Mr. WEISL. General Dornberger, who is now an officer of the Bell Aircraft Co., I believe, and who was the general in charge of the V-2 project—

Dr. VON BRAUN. Yes, sir.

Mr. WEISL (continuing). In Peenemuende when Dr. von Braun worked under him.

Dr. VON BRAUN. If I may add something to his statement, I think this is not even a question of argument; it is a question of figuring it out on a slide rule. We know that Sputnik II weighs 1,280 pounds, and whatever the carrier was that brought Sputnik II up there, it could carry about 4,000 to 5,000 pounds over ICBM range. The same missile, whatever that missile was. That is very straightforward.

Mr. WEISL. I read that statement, Dr. von Braun, because there are still many who say that the newspapers are exaggerating the great danger that we face from Russia. You do not believe that is so; do you?

Dr. VON BRAUN. No; I do not think so.

Mr. WEISL. Dr. von Braun, I have read many interesting articles which you wrote about the importance of controlling outer space, and I have discussed this subject with you quite at length, and was tremendously impressed with your knowledge of that subject.

Would you mind telling the committee in your own words why you believe that it is essential, most essential, for the United States to control or at least to be in outer space as quickly as the Russians or anyone else?

Dr. VON BRAUN. Maybe I should begin with mentioning just some of the technical possibilities that exist for a nation having vehicles, particularly manned vehicles, in outer space.

SATELLITE COULD BE POWERFUL RECONNAISSANCE INSTRUMENT

To some extent my list even goes for unmanned vehicles.

In the first place, a satellite of the weight of Sputnik II would be entirely capable of accomodating a combination of optical and television equipment which could serve as a very powerful reconnaissance instrument.

You could store the pictures which such a reconnaissance satellite takes over enemy territory, and you can play these pictures back while over friendly territory.

You can do that in such fashion that your opponent cannot even jam the system, because there is absolutely no radio contact between the satellite and the ground while the pictures are taken—the satellite is deaf to any kind of radio transmitter located on enemy territory. The satellite receiver is not even turned on while over the territory it is photographing or mapping.

This can be done with an unmanned satellite. With a manned satellite the same technique can be refined to the point that you can

concentrate on details of targets that have already been recognized as being of particular interest. For example, construction work going on inside a country.

I do not believe there would be any amount of privacy, in the sense of military preparations, left, once such a satellite is available.

Remember that a satellite like sputnik goes around the earth about 16 times a day, so it will be approximately twice a day over every point on earth. And even if you have an overcast lingering several days or a week over a certain area, a simple statistical investigation indicates that there will never be a period of more than a week to 2 weeks where you don't have a clear record on what goes on at every spot on earth.

This is the satellite reconnaissance capability.

In addition to this, there exists a bombing capability from orbital vehicles. When I say orbital vehicles, I do not necessarily mean large manned space stations only.

I mean all kinds of manned vehicles capable of orbital or near orbital flight.

These vehicles may just be airplane-type top stages of rockets that go around the earth a few times, or they may be vehicles or permanent stations orbiting for weeks or months. They may be vehicles capable of changing their orbital paths or orbital behavior in between, so as to interfere with possible enemy countermeasures.

All such orbital vehicles can drop bombs on any point on earth with a very high accuracy.

Now when I say "drop bombs" I do not mean they simply release the bomb. Because in an orbit the bomb, won't fall down, it would just continue to orbit. But you can decelerate such a bomb by a small rocket so that it reenters the atmosphere under a shallow angle, and during the ensuing glide through the atmosphere, you can guide the bomb into the target.

The important thing about this technique is that there will always be an optical line of sight connection between the guiding orbital vehicle from which the bomb was detached, and the bomb itself. And ultimately, as both go around the earth, the target will also appear in view of the orbital vehicle, so that at the end, when it comes to aiming exactly at the target itself, you have direct line of sight connecting both between the bombing vehicle and the bomb, and the bombing vehicle and the target.

This permits guiding methods very similar to those presently used with anti-aircraft missiles. It is very straightforward, in a way even simpler than anti-aircraft missile guidance.

A very important aspect of such orbital bombing techniques in my opinion is that it is even applicable to moving targets such as aircraft or fleets or single ships on the ocean. Against such targets an IRBM or an ICBM is rather helpless, due to the unavoidable delay between acquisition of the intelligence on the exact location of the target at a given instance and the time needed to relay that information back to the launching site.

During the flight time of an ICBM even a slow ship could make a very effective evasive maneuver. Not so against an orbital bomb, an orbital guided bomb.

Mr. WEISL. So that, Dr. von Braun, if the Russians should control outer space with satellites, manned or unmanned, before we do and

before we get up there, it is your opinion that this country would be in mortal danger?

Dr. VON BRAUN. I am firmly convinced of that.

I mentioned only two aspects of military satellites. Maybe I should mention a third one. It may be less glamorous than the rest of them but I think it is of very great and immediate importance.

Our ICBM defense plans are based on the very fundamental assumption that we can pick up an approaching ICBM or IRBM by radar.

Right now we have already two sputniks going around the earth:

Sputnik No. II consists of 3 parts, and No. I consisted of 2 parts, of which 1 apparently reentered into the atmosphere in the meantime. So there are still 4 objects going around the earth and a few weeks ago it was 5 objects.

Now these 5 objects go around the earth 16 times a day, which means that they constitute "80 potential ICBM's a day" for the radars that would have to keep track of these things.

Now an anti-ICBM radar would have to acquire an approaching ICBM when it comes over the optical horizon.

To find out whether the acquired object really is an ICBM shooting at me, or whether it is just another part of a sputnik going in an orbit around the earth, requires acquisition and identification of each object. Only after the evaluation clearly identifies the object as a "harmless orbiter" can it be rejected from the list of potential ICBM's and the radar be freed to deal with another object.

This means that by putting a sufficient number of orbital decoys into orbit, you can saturate an anti-ICBM radar defense system, a very expensive multi-billion-dollar radar defense system, even before it is built.

I have not heard of a better method yet to do something about this dilemma than just to go up there and provide a kind of an orbital garbage collection system to get these decoys out of the orbit again.

To cope with this problem by simply building more radars appears hopeless. For a thousand pounds weight allowance you can build so many of these decoys that you can saturate any radar system. I think this problem alone may be a very important reason why something must be done about this business of control of outer space.

Mr. WEISL. Now, what would you do about it, Dr. von Braun? Would you give the satellite program at least as high a priority as you would the ballistic missile program?

Dr. VON BRAUN. Sir, my feeling is the following: I think our present IRBM and ICBM programs, including the Polaris submarine IRBM program, deserve the highest priority we have today. But I am convinced that with the development teams we have available today, we can get a space program, a long-range space program; going without putting many more scientists into the total effort than are in there right now.

It would cost additional money, but I believe that such a space program may have a rather beneficial effect, in that it would serve to stabilize the existing missile teams.

There will always be ups and downs in the missile business, and I think one of our greatest difficulties right now is that every time a development program is over the hump, there is a mortal danger for that development team to fall apart.

In the missile business, I hope you will excuse my expression, we are talking too much about the apples and too little about the apple

trees. We want apples every year. The best and most efficient way of getting a good apple crop every year is that you treat your apple trees well, that you fertilize them. And if there is a bad year, which happens every now and then, you give them even more fertilizer.

Our technique in the past has been, we pick the apples and then we chop off the apple tree. And then we are greatly surprised that next year we have no apples.

Mr. WEISL. You do believe, Dr. von Braun, do you not, that we have the scientific ability and pool of scientists and technologists today—

Dr. VON BRAUN. Yes, sir.

Mr. WEISL (continuing). To do this job if it is managed properly.

Dr. VON BRAUN. Yes, sir. I believe that there will always be times when a development team is available to take on a new assignment and when such an assignment is even badly needed in order to keep the team intact.

NAVAHO PERSONNEL AVAILABLE

I wouldn't be a bit surprised, now this may sound incredible, but I wouldn't be surprised if 20 to 30 percent of our national guided missile development capacity today was just desperately hoarded and held on company payrolls today without an assignment.

Take, for example, the situation at North American Aviation today. They lost the Navaho project a couple of months ago. Now that whole Navaho team, several thousand people, is standing by and waiting for a new assignment.

I am thoroughly convinced it costs the company a lot of money to keep that team on the payroll, while they are fishing around to get new assignments. In the meantime these people could do something more worth while.

Mr. WEISL. These people could work on the satellite?

Dr. VON BRAUN. Yes; for example—we have quite a few such development groups in the country which are standing by, which are between projects, shall we say. They could take over partial assignments in this space program.

Now, I have given this question, namely as to how such a space program could be organized, considerable thought. There are, of course, conflicting opinions on this subject among the services. And the scientific community again thinks it ought to be done a little bit different than the way the Department of Defense thinks it ought to be handled.

But I think there may be a solution to this which would make everybody happy, or at least 80 percent of the people happy, which would be quite a good batting average.

Mr. WEISL. And also secure.

Dr. VON BRAUN. Yes, sir.

What I think could be done is this: Suppose, shall we call it, a National Space Agency were set up, either under the Secretary of Defense or as an independent agency, and this agency were given its own budget. We have made a detailed plan as to what it would take to run such a thing and just to quote a figure here, we are thinking about \$1.5 billion a year. This is in addition, of course, to what is

presently spent on the military missile programs. This money would be strictly for this long-range space program, for the conquest of space.

When forming this agency, it should also be clearly understood that this is a long-range proposition, that this yearly going rate would be something to plan and rely on, say, for the next 10 years.

Now, this Space Agency would have to set up its own in-house master planning organization where competent people would plan a course of action, a stepwise course of action, on how to proceed to attain certain milestones. For example, to put a man into an orbit on a returnable basis within the next 5 years, and to have a manned space station, say, in 10 years.

The Space Agency should also be free to let project management contracts in certain subareas included in the overall scope.

Senator JOHNSON. Pardon me, did I understand that is to be an independent agency?

Dr. VON BRAUN. Sir, I said it could be either under the Secretary of Defense or as an independent agency. I think the scientific community would prefer having it an independent agency.

Senator JOHNSON. Would that be your recommendation?

Dr. VON BRAUN. Sir, I would suggest to give everybody a day in court before a final decision is made in this area.

Senator JOHNSON. We would do that, but I thought maybe you were ready to have your day today. [Laughter.]

Dr. VON BRAUN. Well, I would prefer to listen to the other people first. There are certainly many pros and cons for both solutions. But I am convinced it would work either way.

Mr. WEISL. You wouldn't want a lot of committees to work with that agency?

Dr. VON BRAUN. No; no committees. [Laughter.]

The basic suggestion would be as follows: Under this concept, the National Space Agency would not handle the ICBM projects and the IRBM projects. These would remain in the services where they are now. The Space Agency would be told, "Your job is to get a man, on a returnable basis, into an orbit in 5 years," shall we say, "and you will build a space station in 10. Here is your own money. You can use the same industrial structure that supports the IRBM and ICBM and other projects, but the head of the Space Agency will make certain that he coordinates his contracts with the heads of the military missile agencies of the services." In other words he would have to sit down with General Schriever, General Medaris, and Admiral Raburn. I think in most areas agreement on noninterference between the missile and the space programs will be much easier reached than is widely believed today, because it simply is not true that our entire missile and rocket development capacity is completely loaded. This is because of those unavoidable peaks and valleys in any such effort.

I would say the situation is in a way, comparable to what we have today with our jet airliners. You are probably familiar with the Boeing 707 jet tanker which was developed with Air Force funds and the fact that Boeing now plans to sell this same basic aircraft as a jet airliner. They have submitted sales offers for the 707 not only to United States airlines, but even to foreign-flag carriers, and they have accepted contracts from them.

Now, there is a very desirable leveling effect in this kind of a thing.

Suppose, for example, the Swissair Lines wants to buy a few 707's, and they sit together with the Boeing people. Boeing will first have to look at their commitments and obligations toward the Air Force with respect to deliveries of 707 tankers. Next they have to look at their previous delivery obligations to other commercial carriers. And only at the end of all this can they tell the Swissair Lines, "We can take delivery on your order only early in 1961."

If the Swiss then don't like it, they go to Douglas and buy DC-8's

This is what I meant with the desirable load leveling effect by providing another sales outlet.

I think the Space Agency could very well assume the equalizing role of the commercial airlines, so to speak. In dealing with the same industrial resources that are engaged in the ICBM and IRBM programs, industry would get all the contracts out of the Space Agency they could handle—and no more. They would be kept on an even keel and everybody would have his fair share in such a space effort. At the same time such sudden crises as have arisen, for example, at North American Aviation with the cutoff of the Navaho project, could very easily be weathered. Because the Space Agency would now walk right in there and say, "We understand you just lost the Air Force Navaho contract. You are probably available for us now."

Mr. WEISL. Dr. von Braun, in order to project a satellite of sufficient weight and size in orbit, we must have an engine or a cluster of engines with a tremendous thrust, and as you and General Medaris previously testified, we have no such engine. And you have recommended that such an engine be developed.

Dr. VON BRAUN. Yes, sir.

Mr. WEISL. And you believe the Russians have such an engine?

Dr. VON BRAUN. Yes, powerful rocket engines are a basic requirement for the conquest of space. We have pretty sound proof that the Russians have, in single units, engines that are many times stronger than the most powerful engine we have in this country, and that they have an even more powerful engine under active development.

Mr. WEISL. And we also know that the Russians have spent considerable time and pooled considerable technological and scientific effort in their race to control outer space.

Dr. VON BRAUN. Yes, sir.

As I mentioned before, I am convinced their concept is a very, very broad one, and that they really consider the control of outer space just as important to them as, shall we say, the Spanish considered the control of the seas in the 16th century.

Mr. WEISL. This is no secret, Dr. von Braun, because it has been published and republished.

Dr. VON BRAUN. Yes.

Mr. WEISL. Both in Russia and the United States.

Dr. VON BRAUN. Yes.

Mr. WEISL. Are you familiar with the Rand report?

Dr. VON BRAUN. Yes, sir.

RAND REPORT ON RUSSIAN OUTER SPACE EFFORT

Mr. WEISL. The Rand Corporation is an affiliate of the United States Air Force, and they have published a book which you no doubt

have seen, showing the effort, showing the great amount of energy and proportion of their resources that the Russians are using to control outer space.

In fact, in this very book that you have seen, the Rand project compiled from translated Russian literature, showed when they would put the sputnik in orbit, and I would like to put the Rand project in evidence, Mr. Chairman.

Senator JOHNSON. Without objection, the United States Air Force Project Rand Research Memorandum will be placed in the record.

Mr. WEISL. It is unclassified.

(The report referred to follows:)

INTRODUCTION

PRELUDE TO SOVIET SPACE FLIGHT

The announcement by the Soviets in June 1954 of the inauguration in the Soviet Union of the "world's first" nuclear power station was preceded by an accelerating flood of newspaper and magazine articles on the various aspects of nuclear energy—especially the peaceful applications thereof. In a strikingly similar manner the recent¹ announcement by the U. S. S. R. of its intention to launch several artificial earth satellites in polar orbits—the high point of the advent of the International Geophysical Year—was preceded by a plethora of articles on space flight in the Soviet press.

The signal to begin wide-scale publication of articles and books on space flight ostensibly was the assertion by Academician A. N. Nesmeyanov, president of the U. S. S. R. Academy of Sciences, before the World Peace Council in Vienna on November 27, 1953, that "Science has reached a state when it is feasible to send a stratoplane to the moon, to create an artificial satellite of the earth." Translations of some of these articles are available in RAND Research Memorandum RM-1760: A Casebook on Soviet Astronautics (pt. I of the present study). Other then stressing the work of the early Russian astronauts—Tsiolkovskii, Tsander, and Kondratyuk—all of whom died in the mid-1930's, and occasionally discussing a radio telecontrolled tankette-laboratory project for lunar exploration, these articles failed to reveal any significant Soviet developments in this field.

Official interest in space flight was revealed by the fact that on September 24, 1954, the Presidium of the U. S. S. R. Academy of Sciences established the K. E. Tsiolkovskii gold medal for outstanding work in the field of interplanetary communications to be awarded every 3 years beginning with 1957. Shortly thereafter the Presidium established a permanent interdepartmental Commission on Interplanetary Communications to "coordinate and direct all work concerned with solving the problem of mastering cosmic space." Academician L. I. Sedov, a topnotch hydrodynamicist, was appointed chairman, and M. K. Tikhonravov—who designed and successfully launched liquid propellant atmospheric research rockets in 1934—was appointed vice chairman.

In August 1955, the Soviet Union was represented by two observer-delegates—Academician L. I. Sedov and K. F. Ogorodnikov, an English-speaking professor of astronomy at the Leningrad State University—at the Sixth International Astronautical Congress in Copenhagen, Denmark. In 1956 the U. S. S. R. Academy of Sciences applied for membership in the International Astronautical Federation. The application was voted on favorably during the Seventh International Astronautical Congress in Rome in September 1956. Moreover, the Soviet Union's lone observer-delegate to that Congress—L. I. Sedov—was elected a vice president of the IAF.

Up to this time the official Soviet position with regard to its activities in the field of astronautics was one of extreme reticence. The myriad articles on the problems of space flight that appeared in the popular press presented, for the most part, well-known information from the western press with only occasional broad hints as to native developments in the Soviet Union. Soviet technical journals, however, continued—as they had in the past—to present from time to time articles of considerable interest and merit, especially in the fields of flight mechanics and hydrodynamics.

Soviet uncommunicativeness ended in December 1956, when a delegation of 13 scientists, headed by Academician A. A. Blagonravov, an armaments specialist

¹ See appendix XVI.

and a member of the Presidium of the Academy of Sciences, attended the First International Congress on Rockets and Guided Missiles in Paris, France. There the Russians presented two papers which revealed the prodigality of the Soviet rocket test program by the use of an experimental technique in which the measuring instruments are not carried in the rocket itself, but in automatically jettisoned containers, the results being recorded on film and the containers recovered by parachute. The papers were entitled, "Study of the Upper Atmosphere by means of Rockets at the U. S. S. R. Academy of Sciences," by S. M. Poloskov and B. A. Mirtov, and "Study of the Vital Activity of Animals during Rocket Flights into the Upper Atmosphere," by A. V. Pokrovskii, director of the U. S. S. R. Institute of Experimental Aeromedicine. (For translations of these papers see appendixes XI and XII.)

Figure 1 is a sketch—based on a newspaper photograph—of an instrument container 2 meters long and 0.4 meter in diameter used for upper atmospheric research. It is essentially a metal cylinder divided into three sections. The lower section is hermetically sealed and contains power supplies, ammeters, camera, and the program mechanism which controls the operation of all the instruments in the container. The center section—which is open to the atmosphere—contains evacuated glass sampling flasks, thermal and ionization gages, etc. The upper section contains a parachute and is also hermetically sealed. The bottom of the container is equipped with a set of spikes to ensure a vertical landing. The container, which weighs about 250 kilograms, is jettisoned automatically in the descending phase of the trajectory at a height of 10 to 12 kilometers above the earth's surface.

Figure 2 is a sketch of a catapultable chassis used in studying the behavior of dogs during round-trip flights to altitudes of 110 kilometers. The dog is secured in a hermetically sealed space suit with a removable plastic helmet and is provided with a 2-hour supply of oxygen. The chassis is equipped with radio transmitter, oscillograph, thermometers, sphygmometer, camera, and parachute. Two such chassis are fitted in the rocket nose section which separates from the body of the rocket at the apex of the trajectory. One chassis separates from the nose section at a height of 80 to 90 kilometers and parachutes to the ground from a height of 75 to 85 kilometers. The other chassis separates from the nose section at a height of 45 to 50 kilometers, and falls freely to a height of 3 to 4 kilometers before parachuting to the ground.

As one might expect, the subject matter of these two papers has received extremely wide publicity in the Soviet press. Probably the most comprehensive review was given by Academician Blagonravov himself in an article entitled "Investigation of the Upper Layers of the Atmosphere by Means of High-Altitude Rockets," *Vestnik Akademii Nauk SSSR*, June 1957.² Besides mentioning by name the key personnel in the program, Blagonravov states that cosmic ray investigations by means of rockets began in the Soviet Union in 1947, that atmospheric composition studies to altitudes of 100 kilometers began in 1949, and that systematic studies of the atmosphere—including the use of dogs—were conducted from 1951 to 1956.

By way of interlude, a Tass dispatch datelined Moscow, June 18, 1957, reads as follows:

"At a press conference held by the State Committee for Cultural Relations with Foreign Countries on June 18, the correspondents were shown living travelers into extraterrestrial space—3 dogs who were sent up in rockets to a height of 100 kilometers and more. Two of them have made two flights each and are in good health. All the flights were filmed. It was found that the animals behaved normally when flying to this height at a speed of 1,170 meters per second. Alexei Pokrovskii, a member of the Soviet Committee for the International Geophysical Year, said: 'I would like the British correspondents to inform the British Society of Happy Dogs about this because the society had protested to the Soviet Union against such experiments.'"

Several interesting studies, reflecting various degrees of originality, have appeared recently in the Russian popular scientific literature. One is the idea of worldwide television broadcasting by means of 3 earth satellites symmetrically spaced in an equatorial orbit at an altitude of 35,800 kilometers (appendix IV). Another is the use of earth satellites for the experimental verification of the general theory of relativity (appendix VI). The study of the biological problems of interplanetary flight continues to be the subject of considerable discussion and investigation (appendixes V and IX).

² Vol. 27, No. 6, pp. 25-32.

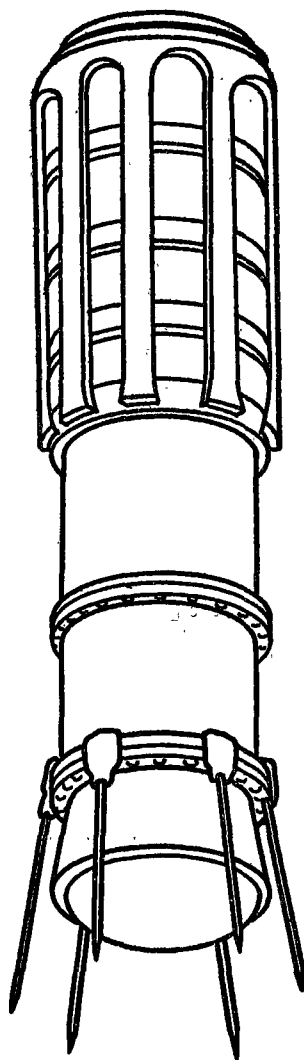


FIGURE 1.—Instrument container used in Soviet atmospheric rocket research.

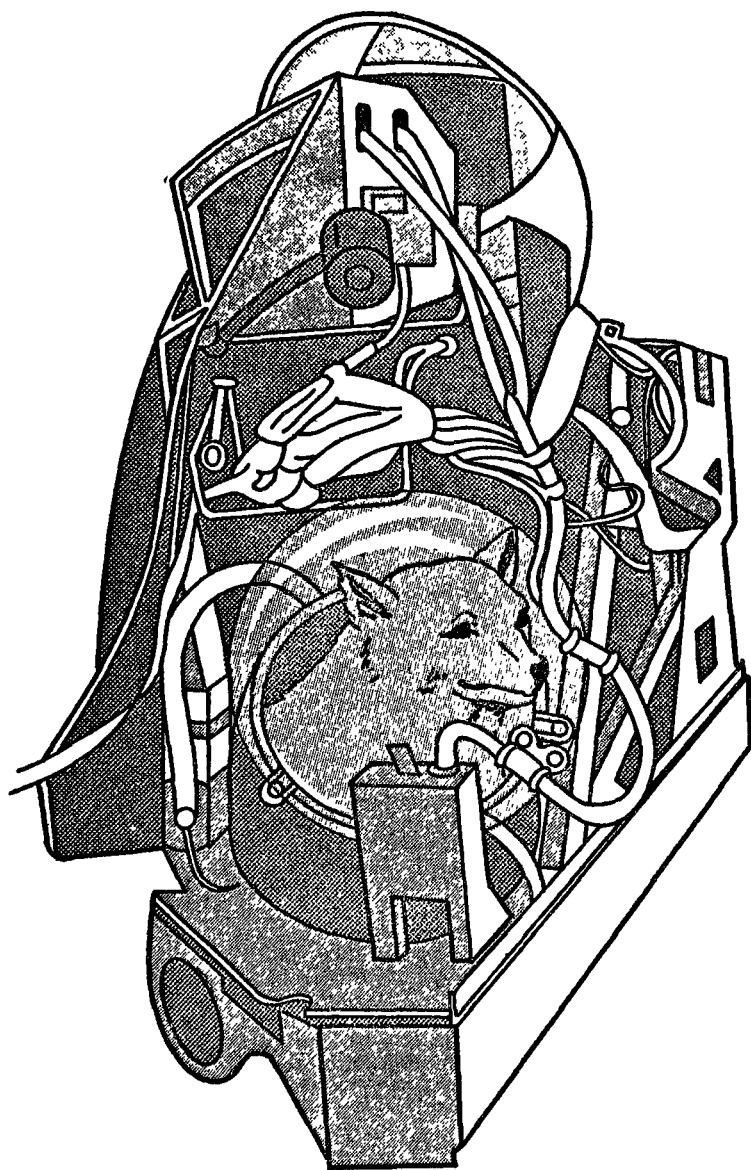


FIGURE 2.—Catapultable chassis used in study of canine behavior in rocket flight.

Russians technical literature—as inspection of the bibliographies in both parts of this Casebook clearly indicates—contains a wealth of evidence of native competence in the various theoretical aspects of rocketry and space flight. Such items as the Proceedings of the All-Union Conference on the Study of the Stratosphere March 31 to April 6, 1934 and the collections of papers entitled *Raketnaya Tekhnika* (Rocket Technology) and *Reaktivnoe Dvizhenie* (Jet Propulsion), published in 1935 and 1936, clearly indicate that the Russians possessed a relatively high degree of technical sophistication more than 2 decades ago. It is interesting to note that several of the investigators who contributed to those early publications are active today in the field of rocket propulsion and space flight.

Recent Russian technical literature gives abundant evidence of continued progress in the various disciplines associated with space flight. Not the least is the publication a few years ago of tables of thermodynamic properties from 298° K. to 5,000° K. of such chemical species as F_2 , HF, CH, CH_2 , CH_3 , and C_2 . The first 2 indicate an interest in fluorine as an oxidant in rocket propellant systems, and the latter 4 an interest in hydrocarbons as possible propellents in nuclear rockets.

In celebrating its 125th anniversary in 1955, the Moscow Higher Technical College, otherwise known as the Bauman Institute, published a collection of 19 papers on theoretical mechanics, several of which had direct applications to space flight. One of these is particularly relevant and is entitled "Calculation of the optimum trajectory for the transition of a rocket to a given circular trajectory around the earth," by V. F. Krotov.

In February 1956, a conference on the problems of the physics of the moon and the planets was held in the astronomical observatory of the Leningrad State University. More than 50 scientists participated. The two principal topics for discussion were (1) the questions of planetology connected with the problems of astronautics, and primarily, the question of the state of the moon's surface, and (2) the exchange of opinions and plans for observations of the coming great opposition of Mars in September, 1956. Prof. N. P. Barabashev, conference chairman and director of the Khar'kov University Observatory, pointed out that the importance of planetology is growing substantially in connection with the demands of cosmonautics and that at the same time the responsibility of planetary, and especially of lunar, investigators is increasing. M. K. Tikhonravov, vice chairman of the Commission on Interplanetary Communications, enumerated the basic questions the answers to which astronauts expect from the science of planetology.

Under the caption "Cosmic Boomerang" (appendix XIII), the Soviet press recently gave considerable notoriety to a space flight project headed by Prof. G. A. Chebotarev at the Institute of Theoretical Astronomy in Leningrad. According to Chebotarev's calculations it is possible with the expenditure of only 16 tons of propellant to launch a rocket vehicle weighing 50 to 100 kilograms with an initial velocity of 11 kilometers per second in an elliptical orbit around the moon. Flying solely under gravitational forces the vehicle would round the moon at a distance of 30,000 kilometers and return to the earth in 236 hours after covering a total path length of about 1 million kilometers.

The most recent and probably most startling disclosure in connection with Soviet space flight activities is a paper entitled "Some Questions on the Dynamics of Flight to the Moon" by V. A. Egorov of the Steklov Mathematics Institute in Moscow (appendix XIV). It appeared in the journal *Doklady Akademii Nauk SSSR*, March 1, 1957. The paper is a 4-page summary of a systematic investigation undertaken from 1953 to 1955 to find satisfactory solutions for the fundamental problems in the theory of flight to the moon: specifically, the form and classification of unpowered trajectories, the possibility of circumflight of the moon with return to the earth, the possibility of periodic circumflight of the moon and the earth, the problem of hitting the moon, and also the particularly important question of the effect of the dispersion of initial data on the realization of hitting or circumflight. More than 600 trajectories were calculated by means of electronic computers and were classified as hits, circumflights or afflights, i. e., approach trajectories which do not encompass the moon but allow one to see everything on its opposite side and to return to the earth. This investigation is quite similar to studies of the general trajectories of a body in the earth-moon system that are being conducted in this country. The general results of the studies are in substantial agreement. Unfortunately, however, specific numerical comparisons are not feasible because of the paucity of data in the Russian article.

The red-letter date on the Soviet astronomical calendar is September 17, 1957. This is the 100th anniversary of the birth of K. E. Tsiolkovskii, the founder of the science of astronautics. Though it comes rather early in the current International Geophysical Year, there could be no more fitting way of celebrating this occasion—

from the Russian point of view—than to establish the first artificial earth satellite in honor of Konstantin Eduardovich Tsiolkovskii.

That this is a distinct possibility is borne out by a combination of two factors: (1) the announced intention of the Soviet Union to launch several earth satellites in polar orbits during the IGY (one must remember that by its very nature a polar orbit launching is a considerably more ambitious task than an equatorial orbit launching), and (2) the postponement of the launching date of the Project Vanguard vehicle until late 1957 or early 1958. The prestige and propaganda value to be gained from a premier launching of an earth satellite, whether instrumented or not, undoubtedly present a circumstance far too attractive for the opportunists in the Kremlin to ignore.

Dr. VON BRAUN. Mr. Weisl, I was not quite finished with my proposal on the National Space Agency, if I may just finish this.

Mr. WEISL. Please continue, Doctor.

Dr. VON BRAUN. So far I have mentioned only the vehicle aspect of this program. I said if this Agency would be supplied with sufficient funds, I was convinced that it could use the same resources that are presently used for the ICBM, the IRBM, and other programs, without undue interference with those programs. I said that in fact it would even have a very beneficial effect on those programs because it would tend to stabilize the development teams. For these teams could take over part assignments in the space program whenever they were confronted with a temporary reduction in their workload, for instance because of a cancellation or because they are over the hump with one development program and have not yet picked up a new one.

Now in addition to this rocket-vehicle program which represents, so to speak, the transportation angle, or the industrial phase of the conquest of space, there is of course much pure and applied research involved in this outer space business, too.

For example, the outer space physical research program which is presently going on under the auspices of the IGY, should most certainly be continued after the IGY is over. But right now there is no agency in this country which is really responsible for its continuation.

Right now this program is in the hands of the National Committee for the IGY, but under the charter of that Committee it will be dissolved on the 31st of December 1958.

The continuation of this research program would, in my opinion, be a logical assignment to the National Space Agency.

Senator SALTONSTALL. Mr. Counsel, I would appreciate it very much if you would ask Dr. von Braun to repeat the first part of that.

What is this that is going to continue beyond the geophysical year? I did not get that.

Mr. WEISL. IGY?

IGY EFFORT COULD BE INCORPORATED IN SPACE AGENCY

Dr. VON BRAUN. Under the auspices of the International Geophysical Year, the United States has agreed to conduct a certain amount of environmental research with satellite rockets. This means instrumentation will be put into the satellites and the information on the physical environment in outer space will be radioed down to the ground.

Now this program is presently administered by the United States National Committee for the International Geophysical Year, which will go out of business on the 31st of December 1958. I think this

IGY space research program is only the humble beginning of much more to come, if we are to conquer space. So there ought to be some agency under which this kind of investigations are being continued.

Senator SALTONSTALL. Mr. Chairman, with your permission might I ask a question?

Senator JOHNSON. Senator Saltonstall.

Senator SALTONSTALL. What you are saying is, you believe there is value in continuing this National Committee or some part of it on a national program rather than on an IGY, International Geophysical Year, program.

Dr. VON BRAUN. Sir, what I was suggesting was to incorporate this whole effort into the National Space Agency which I am proposing here.

Senator SALTONSTALL. I see. Thank you.

Dr. VON BRAUN. As a logical part of their assignment.

Senator JOHNSON. He suggested the National Space Agency and he says he is now giving us things that ought to go into this Agency. One thing is the research being conducted by IGY on space exploration. He would have it go into this Agency.

Senator SALTONSTALL. Thank you.

Dr. VON BRAUN. There is another area: Space medical research is presently being conducted at 2 Air Force bases; namely, Randolph Field, Tex., and Wright Field, Ohio, and at 2 Navy bases; namely, Pensacola, Fla., and Johnsville, Pa.

All this effort is necessary and in competent hands, but I think it would be much more efficient if the entire space medical research program would be transferred to the National Space Agency which would then also conduct, for example, animal experiments with orbiters, et cetera.

Space reconnaissance and communications satellites is another logical assignment to the National Space Agency.

I mentioned already the reconnaissance potentialities of satellites, but there are still other possibilities.

For example, a satellite can be used as the most efficient communications carrier that has ever been invented.

If you combine modern techniques of high-speed coding, as we use them in electronic digital computers today, with modern broadband-width tape recorders you have a machine which is capable of printing the contents of an entire book on a magnetic tape within a matter of 2 or 3 seconds.

Now suppose you have a satellite equipped with such a multichannel tape recorder, and you have a ground station which can flash messages up to the satellite. When the satellite, shall we say, passes over Chicago, it takes on all the messages Chicago has for Washington. Five minutes later the satellite passes over Washington and plays the messages for Washington back, clears the tape, and takes on messages Washington may have for, say, Capetown, et cetera.

Mr. WEISL. Do you think Washington could get a message that quickly? [Laughter.]

COULD HANDLE ENTIRE MAIL VOLUME OF EARTH

Dr. VON BRAUN. The storage capacity of such satellites using these modern coding techniques is downright astronomical. We have calculated that you can handle the entire mail volume of the entire

earth, and still have plenty to spare, with about six satellites working in a compound system.

I think if you gentlemen are interested in revenue, just charge one penny a word for this kind of mail service, and this thing could really make money for itself.

I am merely mentioning this as another aspect of the coming space age.

I just feel this kind of thing obviously does not belong in the Navy or the Air Force or the Army. It is a development of an entirely new technology, and it will probably put all the post offices all over the world out of business sooner or later.

Mr. WEISL. Doctor, could weather be affected by the satellite?

Dr. VON BRAUN. Absolutely. I am convinced there can be no better and more reliable weather forecasting service than from a satellite, particularly from manned satellites.

Right now one of the greatest difficulties in weather forecasting is that nobody knows exactly what the total cloud coverage of the earth is at each instant.

This is one piece of information that you can gather within 1 second by taking a photograph of the earth from an orbiter.

Mr. WEISL. Could storms and hurricanes be prevented?

Dr. VON BRAUN. I would not say prevented, but they can certainly be predicted with a very great accuracy.

But the combination of satellite weather surveillance methods and earthbound weather influencing methods, such as rain seeding and paint dusting of snowfields, could most certainly provide an effective combination of weather forecasting and weathermaking.

I would also like to mention that as a result of our—

Mr. WEISL. Tell us a little more, please, Dr. von Braun, about weathermaking.

Dr. VON BRAUN. I am not an expert on meteorology, but I think several methods in influencing weather are presently already in practical use. Rain seeding is one of them. I think studies are underway to influence the course of hurricanes.

Senator SALTONSTALL. What is that word?

Dr. VON BRAUN. Rain seeding, seeding of rain. You send an airplane over the clouds and seed particles into the clouds in order to make the clouds precipitate the humidity they collect.

Senator SALTONSTALL. Thank you.

Dr. VON BRAUN. Finally, there is one more logical area of activity for a National Space Agency. When the IGY will be over by the end of 1958, the earth will be covered with a great number of optical and electronic observation stations which were part of the satellite Moonwatch program, or part of the so-called minitrack and microlock picket line consisting of radio receiver stations for the tracking of satellites.

Now, it would appear to be highly desirable to continue to operate this international network of observation stations. This is not limited to the United States, of course, because an orbiter goes around the earth. So, tracking of satellites is, of necessity, an international effort.

I think the National Space Agency would be the most natural and logical choice to continue to represent the United States in all international matters arising out of this outer-space program—such as

the operation of such tracking stations or the acquisition of landing rights for returning space vehicles in other countries, et cetera.

So, my recommendation would be, if I may recapitulate it once more, that the ICBM and IRBM programs remain in the services, if for no other reason than not to rock the boat at this critical time; but that, for the purpose of conquering outer space, a new national effort outside of the services be made, and that a separate agency be set up for this.

Right now, there is every evidence that the three services are already "jockeying for position" in the battle for space.

Space is a very fashionable word today, although it was almost taboo in the Pentagon 6 months ago.

Mr. WEISL. What is that?

Dr. von BRAUN. It was taboo.

Senator JOHNSON. Space was taboo in the Pentagon 6 months ago, and today it is a very fashionable word. Go ahead.

Dr. von BRAUN. Everybody tries to get into the act now, but I think it would be very shortsighted to permit things to develop this way. Conquest of space should really be a national effort, rather than a single-service effort.

Mr. WEISL. Have you completed?

Dr. von BRAUN. Yes; I am finished with the proposals.

Mr. WEISL. Thank you very much, Dr. von Braun. Is there anything you would like to add, in connection with some of the questions that I asked, or in other areas?

Dr. von BRAUN. May I go through my papers?

I have one note here that I would like to say a few words about. You asked me about the factors delaying progress in the missile field, and, in this connection, one reads a lot these days about so-called interservice rivalry. I should like to make a few remarks about this particular question.

SERVICES COOPERATE, BUT IRRESPONSIBLE STATEMENTS HURT

It has been our observation at the Army Ballistic Missile Agency that the cooperation between the services themselves has always been excellent. For example, as long as we were associated with the Navy on the Jupiter project (the Jupiter originally was meant to be, also, a ship-based missile), our cooperation was beyond reproach. It was as good and smooth as it possibly could be. Only recently, the Navy recovered the Army-developed experimental nose cone from the ocean.

The same can be said about our cooperation with the Air Force, in particular with the Air Force-operated long-range proving ground in Florida.

The support we get from General Yates is not only beyond reproach, but I would say the fellows down there go out of their way to accommodate our Army test-firing program.

So, in the areas of practical work, the cooperation with the other services is just perfect. Even in the much-debated IRBM application by the Air Force the cooperation is fine. The Air Force assigned to us an Air Force officer by the name of Colonel Erlenbusch, who handles the incorporation of the Jupiter missile project into the Air Force operational scope. This work is proceeding as smoothly as can be.

And yet there are certain areas where I believe something could be done to improve the atmosphere.

By and large, there is good will in the services on both sides, among personnel in uniform and among civilians, but the enthusiasm that exists on both sides is occasionally dampened by some irresponsible statements on the part of some individuals.

For example, we hear all of a sudden that somebody says our Jupiter nose-cone test, I mean the successful reentry and recovery of that nose cone displayed by the President, was nothing but a scientific stunt. Statements like this hurt the cooperation, no matter whether they are made by competitors or by people who just want to muddy the waters.

I think there is a particular area which deserves attention in this regard and that is the trade journals. Certain trade journals publish quite frequently some rather vitriolic articles, taking a very one-sided stand in favor of one of the services. Usually, they have been fed some half-truths by somebody who just wants to hurt his competitor. He couldn't tell the journal the whole story because it is under wraps, but a well-planted half-truth can create an entirely wrong impression and make a very strong case against the other fellow, whom he wants to hurt.

Now, these trade journals, of course, live from advertising bought by the big corporations, and often seem to feel that they owe it to their advertisers to go to bat for them. I think this kind of ill-informed crusading poisons the interservice atmosphere more than anything else. I would say these kind of publications can be rightfully called an active instigation of interservice rivalry. And, if some ways and means could be found to maintain healthy criticism but to, shall we say, make it less attractive for trade journals to indulge in such active instigation of interservice rivalry, I think the country would be rendered a great service.

I do not know whether any such legislation is conceivable and compatible with the concept of the free press, but, if something along these lines could be done, it would help more than all the talk about whether the different uniforms can live together.

Mr. WEISL. Anything else, Doctor?

Dr. VON BRAUN. No, sir; I think I am through.

Mr. WEISL. Thank you very much, Doctor. That is all counsel has to question Dr. von Braun about, Mr. Chairman.

Senator JOHNSON. Dr. von Braun, why do you want to go to the moon?

Dr. VON BRAUN. This is a very fundamental question; it is the question about what motivates research. Recently, I attended a meeting in New York where somebody said basic research is when I am doing something but I don't know what I am doing.

I believe that the economic benefits of any exploratory work, no matter in what field, come only in the wake of the achievement itself. I think no inventor, no explorer, could ever predict exactly what would follow in the train of his deeds. Most certainly, when Columbus discovered America, he found very little here that was worth talking about and he could not possibly have possessed the imagination to predict all the things that developed on the continent he discovered.

I think curiosity, and nothing else, should be the motivating power in exploration and research, and it is just curiosity why I would like to go to the moon.

VISITING MOON TODAY LIKE FLYING IDEA WAS 50 YEARS AGO

Senator JOHNSON. Why do you think it is important that the free world get there first?

Dr. VON BRAUN. Visiting the moon is only part of the overall concept of conquering space, and in my previous testimony I submitted my views on the tremendous military importance of the unchallenged control of outer space. But military and peaceful scientific exploratory efforts usually go hand in hand.

I see a great similarity between the present rush into outer space and the moving forces behind the development of aviation. And your question, sir, "Why do you want to go to the moon?" sounds very much like the question asked of an aviation pioneer 50 years ago: "Why do you want to fly?" Chances are he would have replied: "Because the birds can fly and I cannot, and I just resent the idea that I cannot fly."

Thus, man learned to fly, and out of this basic urge came aviation, and out of aviation came bombers, and out of aviation also came commercial airlines and closer links between peoples and nations, and, thus, our entire modern concept of a worldwide civilization. And I think this mechanism of logic and causality will apply to space vehicles and space exploration in very much the same way. It will simply widen man's area of activities and extend it beyond our planet, to put it in simplest terms.

Senator JOHNSON. Dr. von Braun, in your judgment, will we have a Jupiter squadron ready for overseas by the end of 1958?

Dr. VON BRAUN. Yes, sir. If that check comes soon, I think we will. [Laughter.]

Senator JOHNSON. What would you like to tell the committee about the decision to establish a new Advanced Weapons Agency in the Department of Defense? Do you have any comment to make on that?

Dr. VON BRAUN. Would you kindly repeat your question, sir?

Senator JOHNSON. Would you care to give the committee your opinion of the decision to establish in the Department of Defense an Advanced Weapons Agency?

Dr. VON BRAUN. Mr. Chairman, I am afraid I am not sufficiently familiar with the details of this concept. All I know about it is what I have read in the papers.

Senator JOHNSON. Very well. I will ask you another question. Do you share Mr. Holaday's opinion that we could put a large satellite up any time we wanted to?

Dr. VON BRAUN. I do not know exactly how Mr. Holaday meant his statement. If he meant that we could shoot a big satellite up tomorrow, then my answer is definitely "No." If he meant we could get a program for a real big satellite rolling if we provided the money now, and shoot it up in something like a year or 2 years from now, then the answer is "Yes."

Senator JOHNSON. You think we have the ultimate capability, but it is far down the road?

Dr. VON BRAUN. Specifically, we could fire—I am talking now about Army capability—we could fire a few satellites weighing many times the 20-pound weight of the Vanguard or our own Jupiter-C satellites still within the International Geophysical Year, which ends on the 31st of December 1958.

Senator JOHNSON. Did I understand you to say that the carrier sending up Sputnik II, weighing 1,200 pounds, that with that same carrier the Russians could have sent a hydrogen warhead 4,000 to 5,000 miles?

Dr. VON BRAUN. Yes, sir.

Senator JOHNSON. Weighing 4,000 or 5,000 pounds?

Dr. VON BRAUN. Yes, sir.

Senator JOHNSON. You have no doubt about that?

Dr. VON BRAUN. No. This is pretty straightforward. A rocket that can orbit a load of, say, a thousand pounds, can throw approximately 3,000 pounds over an intercontinental distance.

Senator JOHNSON. If they chose to and they had the hydrogen warhead, the same carrier that put the dog up there can put a hydrogen bomb on top of the Capitol?

Dr. VON BRAUN. It is a question of whether it would hit. This, I do not know. On the other hand, I think we should not underestimate their capability in regard to guidance systems.

Senator JOHNSON. We generally do, though, do we not?

Dr. VON BRAUN. Pardon me?

Senator JOHNSON. We generally do underestimate them, do we not?

Dr. VON BRAUN. Yes, sir; and I would say the orbits of the sputniks indicate they have a very remarkable demonstrated capability in the guidance area, also. Otherwise, they would not have succeeded putting those orbiters up there.

Senator JOHNSON. So, if you had to speculate, your answer would be, "Yes; they could put a hydrogen warhead on the city of Washington"?

Dr. VON BRAUN. I would think so; yes, sir.

Senator JOHNSON. Have you seen the Gaither report, Doctor?

Dr. VON BRAUN. No, sir.

Senator JOHNSON. Doctor, in your opinion, has the United States made better use of the German scientists than Russia did?

Dr. VON BRAUN. I am very happy with the assignments I have been given in this country, and I am very proud that I could make some contribution in this field so vital to our security.

Senator JOHNSON. We are very happy to have you. But, from what you know about the general situation existing in both countries, do you think that we have fully utilized the ability of the German scientists who came here to a greater extent than Russia has?

Dr. VON BRAUN. Yes, sir; very definitely, yes.

Senator JOHNSON. I gathered that was your testimony. Do you think they could have been better utilized than they have been?

Dr. VON BRAUN. No; I would say—

Senator JOHNSON. If you had got that check.

Dr. VON BRAUN. I would say during the first 5 years after the war, we were not too busy; but after all these crash programs—

Senator JOHNSON. You got time to get acclimated.

Dr. VON BRAUN. Yes, sir.

Senator JOHNSON. Are you too busy now?

Dr. VON BRAUN. Yes, sir.

Senator JOHNSON. Is there anybody in a hurry down where you work?

Dr. VON BRAUN. Very much so, sir.

Senator JOHNSON. That is good news. Have they been getting around any faster in the last 60 days since Sputnik I and Sputnik II? Did it kind of step things up a little, speed them up?

MORALE UPLIFTED AT REDSTONE

Dr. VON BRAUN. I'd say one thing has profoundly changed, and that is the atmosphere in which we work. During the months before sputnik, our entire organization was, for several months, I would say since early 1957, under the constant threat of sudden extinction. We heard, time and again, that since the Air Force was charged with the "roles and missions," in the IRBM field, they would never concede that there was a need for the Jupiter, and so many people thought we would soon go out of business. It is, of course, very difficult to fan enthusiasm, to build up a team and retain esprit de corps in a team, and to persuade people not to take higher paying jobs in industry, when you are told repeatedly that what you are doing is not even needed.

This has abruptly changed with sputnik. I would say on the very same day. We now know that we are here to stay, and that there is probably work enough for all of us, for all our guided-missile teams in this country. But, as I said, the mills in the Pentagon are grinding slowly, and we hope that the good will is followed up with a check sooner or later. [Laughter.]

Senator JOHNSON. I quite agree with you that it is nothing short of disgraceful that you would get an order to go full steam ahead and then General Medaris would have to pull a sleight of hand stunt in the dark of the moon and go over to some other agency to get some money that did not belong to him in order to finance the order that you have gotten. And I hope that as a result of the hearings and the testimony that was brought out here, that the Government of the United States will supply the money that is necessary to carry out the order issued.

Dr. von Braun, did you hear the recommendations that were made by the scientists and manufacturers to this committee as related by the counsel, these six recommendations that seemed to be contained in most of the recommendations made by scientists and manufacturers?

I will read them quickly and then I would like to have any comments you would care to make on them.

First, the United States urgently needs to bring its missile satellite space program under an independent civilian commission.

Do you agree with that?

Dr. VON BRAUN. Well, sir, that might be a little radical. We may run into plenty of static with the services there. In principle, and as a long-range solution, I like the idea. But I think there is a question whether the proposal might not be too radical, and whether a solution limiting this new agency only to the space program and leaving the big missiles in the services would not also work. It would not rock the boat so much at this critical moment.

I would say I would still like to listen and hear what the services have to say to that proposal. If the services buy it, then it might be a good idea. It would certainly be the ideal solution had it been done 2 years ago. I think the question is simply whether today things have not advanced to the point that such a drastic reorganization would cause so much upheaval and new delays that it may hurt our immediate objectives in the ICBM and IRBM programs.

Senator JOHNSON. You do think we need central authority on missile satellite space programs? The question of whether it is independent or service would have to await further testimony and evaluation of it?

Dr. VON BRAUN. Sir, I would put it this way: We have an active missile program today, but we do not have an active space program today. Therefore, if you set up something new for the space program alone, there could be very little interference simply because nothing else exists—despite the fact that these days everybody is trying to stake out a claim in that area.

Senator JOHNSON. With the space program as you suggest, leave the missile program where it is?

Dr. VON BRAUN. That is what I would suggest.

Senator JOHNSON. Then the next recommendation, I guess you would agree with, that there is a need for permanent, competent and adequate staff in the Department of Defense to provide leadership to basic and applied research? You would agree with that?

Dr. VON BRAUN. Yes, sir.

Senator JOHNSON. And to make some decisions?

Dr. VON BRAUN. Yes, sir. And may I come back once more to No. 1. I would definitely say if the services can agree to No. 1, then I would be all for it, too. I am just a little bit skeptical about the possibility of delays in our immediate missile objectives.

Senator JOHNSON. You agree with No. 1, the modification. You agree with No. 2. Let us take No. 3. I do not want to rush you, but I have only a limited time. My colleagues want to ask you some questions because your testimony has been quite interesting and exciting and I know they want to ask some questions in their own right.

The research and development program should be on a 3- to 5-year basis instead of an annual basis so that there could be proper planning.

Dr. VON BRAUN. Yes, definitely.

Senator JOHNSON. Fourth, contractors should have more leeway to plan technical decisions.

Dr. VON BRAUN. Yes, sir.

Senator JOHNSON. Five, reduce lead time by making early and firm decisions.

Dr. VON BRAUN. Yes, definitely.

Senator JOHNSON. Sixth, eliminate all overtime restrictions.

Dr. VON BRAUN. Yes, sir.

Senator JOHNSON. So you could enthusiastically agree with all of them except a question mark on No. 1?

Dr. VON BRAUN. Yes, sir. And I would enthusiastically agree with No. 1 also, provided the services can be made to agree to them, too. I think if the proposal runs into too much static it may be advisable to move a little more slowly toward the ultimate objective and take the existing ICBM and IRBM programs—because of their present urgency—out of this plan, at least temporarily, and incorporate them at some later time into the same overall agency.

Senator JOHNSON. We have got a little statement down in the hills where I come from, Texas, you have heard of Texas, haven't you?

You don't think the Russians have been controlling the weather down there, do you?

Dr. VON BRAUN. In Texas?

Senator JOHNSON: We have had 7 years of drought and now we have had 2 years of floods and we have been worried about it but we have a saying down there, put your money where your mouth is.

So you think when the Pentagon issues an order it ought to accompany it with a check.

You could make that a recommendation, would you? [Laughter.]

Dr. VON BRAUN. Yes.

Senator JOHNSON. Thank you very much, Doctor.

Senator SALTONSTALL?

Senator SALTONSTALL. Thank you.

Doctor, just about 1 or 2 questions.

First let me say I certainly am glad too, you are an American citizen and wanted to become one.

Dr. VON BRAUN. Thank you.

Senator SALTONSTALL. And I am confident you have been of great assistance to us in these programs, Doctor.

Dr. VON BRAUN. Thank you.

Senator SALTONSTALL. Now following up what the chairman has just said and asked you concerning that No. 1 problem, because that interests me and I think it is very important.

We had a lot of testimony yesterday and the other days about having one man and one authority and the ability to make decisions, that is what you want and to follow them up, isn't it?

Dr. VON BRAUN. Yes, sir.

Senator SALTONSTALL. What is not clear in my mind is this:

If we have research and development in the space program separately, as you have been discussing it, will there not be a certain amount of duplication or contradiction of efforts between that and the missile program, so that for the time being at least, until we get going, it might be better to have one authority who was responsible for seeing that action was taken in both those programs?

Dr. VON BRAUN. Well, sir—

Senator SALTONSTALL. Or is that too much business for one to have; so much business that he can't do it all?

Dr. VON BRAUN. No, sir, I am certain one man could do it all.

The only difficulty is, one portion of that program, the missiles, is already a going concern while the other portion is a necessary new program. It will cause quite a little bit of disruption in existing arrangements in the missile business if you put everything under a new head at this late stage in the game.

Senator SALTONSTALL. That is my own feeling, and my own feeling has been if we are going to get action, if we are going to have authority that is going to bring action quickly, and get you your check promptly, that it would be wiser to have one man at the head of both of these programs for the time being, at least.

Is that—do you agree with that or do you not?

Dr. VON BRAUN. Sir, I look at it a bit as follows:

I consider the present missile-development plants as contractors very much like, shall we say, in the field of aviation the aircraft plants develop and manufacture new airplanes.

Now, very much like an aircraft plant can sell airplanes to the Air Force, the Navy, and to the commercial airlines, a missile contractor could sell his missiles for military use to the Air Force or the Army and at the same time sell complete rocket vehicles or components for rocket vehicles to a space agency.

Senator SALTONSTALL. In other words, you think there should be one authority or one man on top of both programs for the time being?

He would be on top of the space agency, and he would be on top of the missile agency.

Dr. VON BRAUN. My suggestion was one man on top of the new space agency and leave the missiles where they are now, in the services.

In otherwords, in the missile field there would continue to be one top man in the Air Force, one in the Army, one in the Navy.

Senator SALTONSTALL. Then you would take the space agency completely out of the military if the military agreed to it?

SPACE AGENCY WOULD BE OUT OF SERVICES

Dr. VON BRAUN. At least out of the services. Preferably, even out of the Department of Defense but most certainly out of the services. Either directly under the Secretary of Defense or preferably directly under the President.

Senator SALTONSTALL. So that you would set up an agency, we will say, like the Atomic Energy Commission?

Dr. VON BRAUN. That is right.

Senator SALTONSTALL. Thank you.

Dr. VON BRAUN. Yes, sir.

Senator SALTONSTALL. Now my other question is this, and I think you have made the problem perfectly clear:

You agree with what Dr. Teller told us that impressed me very much, that back in 1945 and up to 1950 we were not willing to take the risk of going ahead with this ballistic missile because we did not have the warhead to go on top of it, and what we have got to do is go ahead and take these risks, if we are going to keep up with the Russian competition.

Dr. VON BRAUN. Yes, sir.

Senator SALTONSTALL. And then possibly have some of them thrown out and others of them develop into what we want, and so for that reason you say let's go ahead and develop an engine today with a—I think you said a million horsepower?

Dr. VON BRAUN. A million-pound thrust.

Senator SALTONSTALL. A million-pound thrust, even though we don't even know what we are necessarily going to put on top of it at the moment?

Dr. VON BRAUN. Yes, sir. More specifically, I would recommend one smaller one, maybe of 400,000 pound thrust and one bigger one, of 1 million pound.

Senator SALTONSTALL. Well, I appreciate your answers, and Dr. von Braun, you are the technical leader of this project at Redstone?

Dr. VON BRAUN. Yes, sir.

Senator SALTONSTALL. And you are going to go ahead and do your utmost down there at that project, whether the check comes today or whether it comes in the full amount tomorrow or half the amount, you are going to keep on doing your very best?

Dr. VON BRAUN. Yes, we will, Senator.

Senator SALTONSTALL. And you are used to frustrations and contradictory orders in Germany before you came here and now in your own country here in the United States and that is not going to faze you?

Dr. VON BRAUN. No; I spent the better years of my life in missile crash programs so I am used to this.

Senator SALTONSTALL. And you are going to keep her rolling and not get discouraged?

Dr. VON BRAUN. Yes, sir.

Senator SALTONSTALL. Thank you.

Senator STENNIS (presiding). Doctor, you certainly have covered more than I can digest, and I do not have any additional questions, but I want to especially thank you for your very fine contribution here.

Dr. VON BRAUN. Thank you, sir.

Senator STENNIS. And the splendid work that I know you are doing and will continue to do.

I think your testimony has been very valuable to the committee, and will be very valuable to the Nation.

Dr. VON BRAUN. Thank you, Senator.

Senator STENNIS. Senator Flanders?

Senator FLANDERS. Dr. von Braun, you stated, if I remember correctly, that you joined the rocket site at the age of 18.

Dr. VON BRAUN. Yes, sir.

Senator FLANDERS. May I inquire, and this is a personal question, may I inquire whether at that time you were interested in missiles or in space?

Dr. VON BRAUN. At that time in space.

Senator FLANDERS. And you have now come back, you are now coming back to your original interest.

Dr. VON BRAUN. Yes, sir.

Senator FLANDERS. I just want to say, Mr. Chairman, that I do not know when I have had the possibilities of the future opened up as we have had here today in this parallelism between the conquest of the ocean in the conflict between England and Spain, and the conquest of space.

I think the parallelism is close. It expresses the thing which affects the future of mankind. And, as Dr. Teller told us, but with not quite, somehow, the same significance that Dr. von Braun has told us, we have entered a new age, we have entered a space age.

I might also just make one very brief observation:

Your various references to production problems interested me, because I was in the machine tool business for 50 years before I came to the Senate, and it sounded familiar, and it sounded sensible, and I want to compliment the country on having at its service a man whose feet are on the ground and whose head is in space. [Laughter.]

Senator STENNIS. Very good.

I think you made a good statement, Senator Flanders.

Senator Symington?

Senator SYMINGTON. No questions at this time.

WHAT KEEPS IT UP

Senator STENNIS. Doctor, may I ask you one question. Maybe the other members of the committee have already understood this, but I certainly have not, and there may be others in the country who have not.

What makes the satellite stay up? What keeps it on the move?

Dr. VON BRAUN. Well, I can explain that as follows:

Suppose there was a mountain on the earth that was higher than the atmosphere, and you would put a gun on top of that mountain, firing in a horizontal direction; then the shell would travel a certain distance and then fall back on the ground.

Now, as you increase the muzzle velocity, the shell will travel further. If you increase the muzzle velocity even more, the distance traveled will again be greater; and at a certain speed, the curvature of the trajectory in which this shell would fall down to the ground matches the curvature of the earth.

Under this condition, the shell would simply travel around the earth, and it will always fall, but the earth curves away underneath as the thing tries to approach its surface, and so it will keep going and falling around the earth until it will hit the breech of the gun from the rear. You then have an orbit.

The mathematical criterion for this condition is simply that the centrifugal force in that curved trajectory must be equal to the gravitational pull of the earth. If that condition is met the shell goes around in circles.

Senator STENNIS. So it is falling all the time, but it just cannot hit the ground?

Dr. von BRAUN. It is falling all the time, and just can't make it; yes.

Senator STENNIS. It never hits the ground. [Laughter.]

I think you have made a very simple, clear, understandable statement, more so than I had heard.

Are there other questions from counsel or any member of the committee?

Did you have anything further?

Senator SYMINGTON. I might ask 1 or 2 questions of the witness.

Dr. von Braun, you testified last year there were 40,000 people working on the V-2.

Dr. von BRAUN. Yes, sir; including production and everything.

Senator SYMINGTON. How many have you working down at Huntsville?

Dr. von BRAUN. One hundred and twenty former V-2 men. But they were the cream of the crop. Those 40,000 included——

Senator SYMINGTON. How many people, all told, have you down there working on missiles?

Dr. von BRAUN. In my Division, the Development Operations Division of the Army Ballistic Missiles Agency, I have 3,500 people.

Senator SYMINGTON. Thirty-five hundred?

Dr. von BRAUN. Thirty-five hundred; yes, sir.

Senator SYMINGTON. How many are at Chrysler working on it?

Dr. von BRAUN. My figure of 3,500 should not be compared with the 40,000 men on the V-2 program though. Because the equivalent figure would have to include Chrysler and subcontractor personnel, and then, of course, our present personnel figure is much higher.

Senator SYMINGTON. Have you any figure for that?

Dr. von BRAUN. No, sir; but I can furnish you that figure, if you wish.

Senator SYMINGTON. I thought you might have a figure.

What do you think is the next thing the Russians are going to do? What would be your guess?

Dr. VON BRAUN. I believe they will try to shoot at the moon. With their rocket, they can probably carry a 100-pound or 300-pound payload, something like that, to the moon, 1-way.

Senator SYMINGTON. Do you think they might have done it already and missed it coming back?

Dr. VON BRAUN. They may have tried; failed, and said it was a successful ICBM test, I don't know.

Senator SYMINGTON. Would you say that as regards the cone you mentioned we have solved the reentry problem on the IRBM?

Dr. VON BRAUN. Yes, sir; for the IRBM; yes, sir.

Senator SYMINGTON. How about on the ICBM?

Dr. VON BRAUN. The Air Force has a reentry-test vehicle, the so-called Lockheed X17, on which smaller models of the ICBM nose cones have been tested, particularly to study the heat transfer.

These tests, small-scale tests, were apparently successful. Full-scale tests have never been made, simply because there is not an ICBM available yet capable of covering the range with the full payload.

Senator SYMINGTON. Do you think we have the thrust capable now, with any engine that you know of, of throwing up, say, a 1,000-pound satellite?

Dr. VON BRAUN. The ICBM's have a basic capability of orbiting that much, but the vehicles themselves have not been successfully tested yet.

Senator SYMINGTON. I understand that you felt, provided the services approved, you would be for taking ICBM's and IRBM's out of the services and putting them into a new agency?

Dr. VON BRAUN. Sir, I suggested in case this centralized agency runs into too much static, to leave the IRBM's and ICBM's in the services, to limit the task of the centralized agency at first to the space program only, and attach the missile program to it only later. If the services do agree to turn the missiles over right away, however, then it might be a good idea. But I think this is not in my realm to answer, because it is essentially a question of operational use and deployment.

Senator SALTONSTALL. Mr. Chairman——

Senator STENNIS. Will the Senator yield?

Senator SALTONSTALL. I just wanted to ask the Senator if he would clarify the question, because I did not think the doctor's answer was responsive to the Senator's question.

Senator SYMINGTON. I will ask it again.

If the services approved, would you be for taking the IRBM's and ICBM's out of the services and putting them into a new agency?

Dr. VON BRAUN. Yes, sir. Then I would propose to make a space force out of the whole thing.

Senator SYMINGTON. Of course, you would be taking not only the weapons, but the weapons systems, out of the services.

Dr. VON BRAUN. Yes, sir. In this case you have to go all out, do everything.

Senator SYMINGTON. If ultimately the missiles dominated the forces, you would be dissolving the services. Then the Department of Defense would be a Space Department.

Dr. VON BRAUN. Well, sir, I believe that there will always be need for an Air Force, a Navy, and an Army, even if you have absolute space control.

Senator SYMINGTON. But if the predominant weapon in the services is to be missiles, and you take the weapons systems out as well as the weapons, you do not leave much in the way of services, do you, in the way of conduct of our defense, maximum firepower delivered at minimum cost?

Dr. VON BRAUN. Yes. Well——

Senator SYMINGTON. In any case, that is the way you feel about it?

Dr. VON BRAUN. Yes, sir.

Well, but how about fringe warfare, a nonatomic small-scale war breaking out in fringe areas? The space forces, if you want to call them space forces, these space weapons could not be utilized in this kind of war. The space weapon will always be the ultimate, the thing you hope you will never have to use, and that is why I believe there will always be a need for troop airlift and for ships and for Army operations and the capability of policing an area and fighting a local war on a limited scale.

Senator SYMINGTON. And the premise for that thinking would be that you feel that way about anything but all-out war, war which did not utilize nuclear weapons, is that right?

Dr. VON BRAUN. Yes, sir.

Senator SYMINGTON. You have been working in the Army since you came to this country?

Dr. VON BRAUN. Ever since I came to this country; yes, sir.

Senator SYMINGTON. How long have you had full knowledge of the other missile programs in the other services?

Dr. VON BRAUN. Full knowledge since spring 1955, when I became a citizen. I had limited knowledge before that on some projects.

Senator SYMINGTON. Before?

Dr. VON BRAUN. Yes.

Senator SYMINGTON. There are some things we have talked about before, but I think you have explained that, and there is no need to get into it at this time.

The sum and substance of it is that your opinion, after you became a citizen and acquired full information, was radically changed as against the telecast you made on May 8, 1955?

Dr. VON BRAUN. Yes, sir.

Senator SYMINGTON. Is that correct?

Dr. VON BRAUN. Yes, sir; that is correct.

Senator SYMINGTON. I ask one more question, Doctor. May I say you have been a fine witness.

What you have really said in answer to able counsel is that although we have been told the missile programs were speeding up rapidly, they have not been speeded up because the money has not been available; is that correct?

Dr. VON BRAUN. Yes, sir. That goes for the Jupiter production; the Jupiter production, as I said.

Senator SYMINGTON. Well, the Jupiter production is the only ballistic missile program, with the exception of the Redstone, which is inclusive—I believe you call the Redstone “Jupiter-A”, do you not?

Dr. VON BRAUN. Yes, sir.

Senator SYMINGTON. So all you are interested in is Jupiter production, is that correct?

Dr. VON BRAUN. Yes, sir.

Senator SYMINGTON. So as far as what you, yourself, are interested in, whereas to the best of your and my knowledge people have been

told that there is being a big speedup, because of lack of money there has been no speedup; is that correct?

Dr. VON BRAUN. That is correct, sir.

Senator SYMINGTON. Thank you, Mr. Chairman.

Senator STENNIS. Doctor, again we want to thank you for your testimony here and your very valuable contribution here to this form.

Dr. VON BRAUN. Thank you, sir.

Senator STENNIS. If there are no other questions, you are excused now from the witness table. Stay with us as long as you will.

Our next witness will be Dr. William H. Martin.

Dr. Martin, will you come forward, please. Dr. Martin, in keeping with the custom of the committee, will you hold up your right hand and be sworn.

Do you solemnly swear that your testimony here in this committee hearing will be the truth, the whole truth, and nothing but the truth, so help you God?

Mr. MARTIN. I do.

TESTIMONY OF WILLIAM H. MARTIN, DIRECTOR OF RESEARCH AND DEVELOPMENT, DEPARTMENT OF THE ARMY

Senator STENNIS. Dr. Martin, I will insert in the record here a biography.

(The biography referred to is as follows:)

WILLIAM H. MARTIN, DIRECTOR OF RESEARCH AND DEVELOPMENT, DEPARTMENT OF THE ARMY

William H. Martin, appointed Director of Research and Development for the Army effective September 1, 1955, had been Deputy Assistant Secretary of Defense for Applications Engineering since January 1954. Prior to that time, he retired from his previous position as vice president of the Bell Telephone Laboratories. As Director, Mr. Martin reports directly to the Secretary of the Army and has the same degree of responsibility as that given to an Assistant Secretary of the Army. The Director is in charge of all plans, implementation, and financing of research and development projects armywide.

Mr. Martin, a native of Baltimore, Md., received a bachelor of arts degree from Johns Hopkins in 1909; a bachelor of science degree from the Massachusetts Institute of Technology in 1911; and a doctor of science degree from Bethany College in 1956. He joined the engineering department of the American Telephone & Telegraph Co. in 1911 and became a member of the Bell Telephone Laboratories in 1934.

Mr. Martin's experience has been largely in the development, design, and evaluation of new equipment and systems for the communications business, but during and since World War II he was in charge also of similar work on military equipment. For his military work during World War II he was awarded a Presidential Certificate of Merit.

Mr. Martin was born in Baltimore, Md., September 27, 1889, the son of Howard W. and Sallie (Hennick) Martin. He is married to the former Margaret F. Grier, also of Baltimore. They have two children, William G. Martin and Isabel Martin Williams. They were residents of Short Hills, N. J., before coming to Washington.

Mr. Martin is a fellow of the American Institute of Electrical Engineers and of the Acoustical Society of America, a senior member of the Institute of Radio Engineers and a member of Phi Beta Kappa, Theta Xi, the Cosmos Club, and the Army and Navy Club.

Senator STENNIS. We are certainly glad to have you here, sir, and we feel that you will be a valuable witness. Our opening examination will be conducted by the committee counsel.

Mr. WEISL. Dr. Martin, when were you appointed Director of Research and Development in the Army?

Mr. MARTIN. I was appointed September 1, 1955.

Mr. WEISL. And by whom were you appointed?

Mr. MARTIN. By Secretary Brucker.

Mr. WEISL. That was the first month Secretary Brucker was in office?

Mr. MARTIN. As I remember, he was appointed in the latter part of July, about the last week. Within a few weeks of that time, he asked me if I would come and be with him in charge of research and development. I took that position the 1st of September 1955.

Mr. WEISL. Would you be kind enough, Dr. Martin, to elaborate on your responsibilities and your experience in these areas, in order that the committee may fully understand the background against which your remarks are going to be made?

Mr. MARTIN. I have been in research and development work all my life in industry. I started out in 1911 with the American Telephone & Telegraph Co., working there in research and development. In 1934 I became a member of the Bell Telephone Laboratories, a subsidiary company of the Bell System. All that time I was in charge of research and development programs, particularly in developing new equipment for use in the communications business.

During World War II, I was in charge of a large number of important military-weapons programs for the several services, and I had some responsibilities in that field from the termination of the war until I came to Washington.

Mr. WEISL. Dr. Martin, in our investigation of the manufacture of weapons of war, particularly missiles, we find that it takes an average of about 10 years from the time that an idea is conceived to the time that that idea is converted into an operational weapon. Can this time be decreased, in your opinion?

Mr. MARTIN. In my opinion, it can be decreased. Of course, in talking about the missile field of the past, we are talking about a new field in military weapons. In some of our past history we had to form operating organizations, manufacturing organizations. There was considerable time taken in that process. But today I am convinced that this time can be materially reduced.

Mr. WEISL. How would you go about reducing this time?

Mr. MARTIN. I would like to go back to some experiences I have had. I am reminded of an experience I had during World War II, by Dr. Houston, who is sitting just immediately back of you. I worked as a contractor on an important weapon job which you might call one of the first missiles. Dr. Houston represented the Government, and we worked together very closely. On that job we made a record under wartime conditions of going from the initiation of research to the availability for operational use in 17 months.

I have worked on jobs for industry where, by planning the programs and scheduling them, we were able to go from initiation to production in 3 years. I think the job that has been discussed here so much this morning, the Jupiter job, was initiated 2 years ago and will have operational capability in 1 year from this month, according to our program, a total of 3 years. That is an indication that we can do these jobs in less than 10 years.

Mr. WEISL. Now, our investigation indicates that such things as planning, organization of the job, review and decisionmaking, committee advice, funding, questions of management, and many other

things take place before an idea is first put into a design, and these steps sometimes take as much as 5 to 6 years. Then another 5 years are spent from the time when the idea is let out to the manufacturer to the time when the idea becomes an operational weapon.

Now, tell us, Dr. Martin, specifically what you have done and what you are trying to do to shorten that time?

Mr. MARTIN. The first thing in any job of this sort is to make sure that you know what you are trying to do, to have a clear picture what it is you are trying to accomplish, what you want to use it for and why.

Then get that accepted and supported by the management group that you are working for. Following that, in my own experience you want to——

Mr. WEISL. If I may interrupt, Dr. Martin, that is the first step, and that goes, according to the charts we have seen, from one department to another, from one advisory committee to another, and that step alone has taken as much as 1 year to 2 years to get through.

Mr. MARTIN. Yes.

Mr. WEISL. That first step you mentioned.

Mr. MARTIN. I realize——

Mr. WEISL. How can we shorten it, Dr. Martin?

Mr. MARTIN. These things come down to people, people and their competence. If you have the right kind of people who know what they are doing, I think you can get the result much quicker.

Mr. WEISL. But sometimes you get the right kind of people. Dr. von Braun is the right kind of a man. I am sure General Medaris is the right kind of a man, but they have got to go through committees and they have got to go through departments. They have got to go through planning boards.

Now, how can we eliminate that and still be efficient and get things done in time?

Mr. MARTIN. I think we can eliminate it if we get competent people in the management of the jobs.

Mr. WEISL. Do not these competent people have to have authority and responsibility?

Mr. MARTIN. Yes.

Mr. WEISL. And funding authority?

Mr. MARTIN. If you are going to give people management responsibility, you have got to give them authority.

Mr. WEISL. Do they have that now?

Mr. MARTIN. Not to the degree I think they should.

Mr. WEISL. What degree do you recommend that they should have it?

Mr. MARTIN. I would like to put it this way, if I may digress a minute in answering that question. I think we bring up here a fundamental concept of how you manage an operation and how you control it. I think there is a tendency in Washington to try to control the operations by specifying ahead of time what should be done in quite a great bit of detail. This comes in the form of directives, of reviews, of presentations which have to be passed on.

In industry today and a great many years back, there is more of a tendency to control the operations of people by judging their results. As General Medaris mentioned here this morning, if he did not deliver the goods, he ought to be put out and somebody else put in. I think

this is one of the very vital factors in getting at this matter of time. It is what attitude we have from the supervisory standpoint as to how we control the jobs and how we monitor the performance of the people.

Mr. WEISL. I know that is a desired result to obtain, Dr. Martin, but what the committee, I am sure, is trying to find out is how to bring that about? How can we do it? You are in charge of research and development for the Army. Tell us, Dr. Martin, how you, if you were in complete charge and had the authority and the responsibility and the authority to allocate the money after it is appropriated—how would you go out to cut down that lead time?

HOW TO GET THE JOB DONE

Mr. MARTIN. I would do it the way I did in industry. When I had a job to do, I defined the job, got it approved, and got my orders to go ahead, and then I was allowed to run the job on my own.

Mr. WEISL. Who gives you the orders to go ahead in the Army?

Mr. MARTIN. Our orders are generated in a process which goes back and forth. We have proposals that come up either through the Army or from our own technical people, from our own operations people, as to what they would like to have, or they may come to us from some of our contractors. Those ideas are put together in comparison with the needs that the operational people have indicated, and out of that comes the proposal to develop something—some new piece of equipment or some new weapon.

Mr. WEISL. How long does it take for that proposal to come out after the idea is conceived?

Mr. MARTIN. I could not say on any definite basis.

Mr. WEISL. Our charts indicate it takes about 5 years from the time that the idea is conceived and accepted to the time that a design is made and the contract let out to industry. Do you agree with that?

Mr. MARTIN. That has happened in some cases, I know. I don't think it needs to take as long as that.

Mr. WEISL. You are taking steps insofar as it is possible in your job in the Army to eliminate that lead time?

Mr. MARTIN. Very much so.

Mr. WEISL. What can be done during the development of an item to insure its suitability for production and operation?

Mr. MARTIN. I would like to make 1 or 2 more comments about your previous question, if I may.

Mr. WEISL. Yes, sir.

Mr. MARTIN. Because I do not think we covered all of the factors in it. One of the important things in this procedure that you mentioned of the time it takes to get a job going, comes back to the question that has been mentioned time and again here today; that is the matter of what we call the decision-making process. It is delay in decisions which really is an important factor, and that comes back to the people who have to make these decisions, their skills, the knowledge available to them. If we can do a better job in getting more competent people in our supervisory and management positions, and also get to them better advice which they can put their faith in, I think we can cut down that time.

There is another very important factor in this matter of progress, and this has also been mentioned this morning a number of times: the matter of funding.

Mr. WEISL. A matter of funding?

Mr. MARTIN. Funding, financing.

Mr. WEISL. Yes, sir.

Mr. MARTIN. After you have determined what the job is and plan as how you are going to do it——

Mr. WEISL. Will you pardon us, Dr. Martin. Senator Saltonstall would like to ask Dr. von Braun one more question.

Senator STENNIS. Mr. Martin, just keep your seat.

Dr. von Braun, will you take the chair there by him.

TESTIMONY OF DR. WERNER von BRAUN—Resumed

Senator SALTONSTALL. Mr. Chairman, I appreciate your courtesy and I appreciate the courtesy of the chairman of the committee to whom I have spoken.

Doctor, what confused me is this, and you and I have just had a little talk out in the hall. I am not clear from your testimony, first, to Senators Johnson and myself and then to Senator Symington, just what your thought is with relation to this administrative setup. As I understand it, you would take the space program out and put it under a separate agency similar, we will say, to the Atomic Energy Commission. If it was a new undertaking, you would like to put the missile work out there with it, but the missile agencies having been developed in the military services, you would leave them for the time being in any event in the military services.

Now, my question is this: We have been talking here in the days gone by and today about one authority to make a decision, one authority to spend the money. My question to you is: If you put a new agency, a space agency, outside of the Department of Defense, would you still have, in your opinion, 1 overall authority, 1 man who would be able to make the decision as to whether for example a million dollars should be put into missiles or whether that million dollars would be put over into the Space Agency.

Would you please clarify to me, in any event, your statement on that?

Dr. VON BRAUN. Sir, my reasoning is the following: I believe that today both in the ICBM and the IRBM area, more than 50 percent of the difficulties involve the problem of fielding these missiles, in other words, of deploying them operationally. In the ICBM and IRBM area land base, the Strategic Air Command of the Air Force has been given this job just recently. If you take the assignment of these missiles away from the Air Force and give it to a newly formed Space Agency, you create a new liaison problem between the Strategic Air Command and that Central Space Agency.

My feeling was that this may retard the immediate deployment of the ICBM's and IRBM's more than can be tolerated at this time, so this would be a rather dangerous move, this late in the game.

In the conquest of space area, however, there is no active program worth mentioning in existence. This is even attested to by the Deputy Commander of the Air Research and Development Command, General Dengler, who made a speech recently wherein he said 6 months

ago there was no space program in the Air Force. So whenever you hear about fabulous space programs today, it is all postsputnik. There is nothing really——

Senator SALTONSTALL. Then would you have one man on top of both those agencies to be able to make quick decisions and get action?

Dr. von BRAUN. Sir, I believe that any possible interference in the industrial areas, shall we say, who gets what hardware from North American or from Chrysler, or from Convair, can be worked out between the Space Agency and the ICBM and IRBM project managers, with the simple understanding that the Space Agency manager must not interfere with the missile schedules. I am convinced that a workable arrangement in this area can be worked out.

Senator SALTONSTALL. So that there would not be one man on top of both programs?

Dr. von BRAUN. No.

Senator SALTONSTALL. Then you have clarified it.

Dr. von BRAUN. My feeling is it would be better for the ICBM and IRBM programs to leave them in the services, at least for the time being, because they have been there that long; but organize a space agency separately to handle the conquest of space and nothing else, plus the research programs involved in this space project.

Senator SALTONSTALL. It is clear now in my mind.

Senator STENNIS. Very well. Any other questions on this point?

Senator SYMINGTON.

Senator SYMINGTON. Dr. von Braun, I want to be sure I understand you. My question was if the services agree that the IRBM and the ICBM should go into the space agency, would you believe that was the right place for them, and I think you said you would.

Dr. von BRAUN. Yes, sir, I would.

Senator SYMINGTON. If you say that, does not that mean—I believe you used the expression “rock the boat”—you did not want to rock the boat. But if it had been decided earlier, you would have preferred to have the IRBM and ICBM in the space agency; is that correct?

Dr. von BRAUN. Yes, sir, definitely.

Senator SYMINGTON. If it could have been done earlier?

Dr. von BRAUN. Yes, sir.

Senator SYMINGTON. And in that way you would have one person in charge of space, and one the military setup?

Dr. von BRAUN. Yes, sir.

Senator SYMINGTON. Is that correct?

Dr. von BRAUN. Yes, sir.

Senator SYMINGTON. I do not agree with you on that because the missile is not only a weapon, but it is a weapons system. I believe the Polaris may be the most important ultimate weapon of the five we are working on today, because it has solid fuel. It may not be, but it may be. If you take it out and put a weapon like that specifically designed for ships, in a space agency, in effect, as I see it you take away the capacity, or the responsibility, or the authority or all three, from the Navy to defend the country in case of trouble.

In effort to follow you correctly, suppose you had a manned space ship which could be a warship in the air, an air warship of a character. Would you put that in the space agency, or would you let the services

decide which one of them should get it? Presumably it would go to the Air Force.

Dr. VON BRAUN. Sir, I believe there are only two possibilities. Either you say the missiles remain in the services—Polaris in the Navy and the IRBM's and ICBM's either in the Strategic Air Command, or, as was suggested earlier (I think by Senator Flanders), mobile ballistic missiles would be assigned to the Army—at any rate, the services would retain and operate the missiles.

This is one way of doing it. In this case the Space Agency would be solely in charge of the general conquest of space—minus missiles—and merely happen to use the same suppliers as the missile programs.

Senator SYMINGTON. I understand that. How about the manned missile now? Ultimately we will have manned missiles. There is a lot of space between 800 miles out and 100,000 feet up. We may have manned missiles at high supersonic speeds, very high mach numbers. Where would they go—in the Space Agency or one of the services?

Dr. VON BRAUN. Sir, I think once we have reached that stage, another quite drastic step exceeding the present concept of the Space Agency would be necessary, namely, the formation of what we might call the United States Space Forces.

Senator SYMINGTON. Then what you are really saying is that ultimately, and this is important to us because we may, after 10 years of effort, get some legislation in this field to save billions, what you are saying is that, in your opinion, ultimately the ideal setup would be the consolidation of all space and all military effort under one man; is that correct?

Dr. VON BRAUN. Yes, sir.

Senator SYMINGTON. Thank you.

Dr. VON BRAUN. But then you have to get one step beyond mere technical responsibility, Senator Symington, and take a chunk out of the Strategic Air Command and also give it to that chief space man so he has the means to also deploy these weapons.

Senator SYMINGTON. Granted, one man would run it; would he not?

Dr. VON BRAUN. Yes.

Senator SYMINGTON. Thank you.

Senator STENNIS. Thank you again, Doctor, for your testimony.

All right, Counsel.

TESTIMONY OF WILLIAM H. MARTIN—Resumed

Mr. WEISL. Dr. Martin, had you finished your answer?

Mr. MARTIN. We were discussing the question of funding on carrying through the development programs. This, I think, is a very important factor and there is a distinction that needs to be made here.

In carrying out our development programs today, we are working in a field where the technology is evolving very rapidly. This applies to the whole technological field, but in the military field in particular because of the large amount of activity and support we are putting into that field. If we do not carry through our developments correspondingly rapidly, we are likely to get things available at a time that they are obsolete from the technical standpoint, and that means they are not good enough.

Now, with the available technology, with the available skills, available facilities, there is an optimum rate of progress, and in carrying through our development jobs, we should fund the important jobs at this optimum rate. That means that you determine how long you should take to do that job on a good schedule, and then you fund it and you fund it not just part of a year at a time but preferably several years' programs so that you can carry it through.

Now, if we are funding our jobs at lower rates than what I have called optimum, we are tending to buy obsolete equipment. I think this is a very important factor when we consider the matter of resources available, as have been talked about here today. When you have a total amount of resources and you have a number of things you need to do and you cannot fund them all at the optimum rate, the tendency is to try to carry a number of them at less than the optimum rate. Insofar as you do that, you run a great risk of coming up with obsolete equipment when you are through.

I stress this because this matter of rate of progress is something that is very easy to delay, and if you delay it too much and try to carry all of the jobs that you would like to carry, the result may be disastrous from the standpoint of getting things too late to be effective.

Mr. WEISL. We are all seeking ways and means, Dr. Martin, of getting that done, and you believe that the way to do it is to get competent men without the interference of committees, without advisory boards, and give them authority and responsibility in funding?

Mr. MARTIN. If you get competent people, you do not have to have all these advisory boards.

Mr. WEISL. I am sure you are a competent man, and we have got advisory boards in the Army; haven't we?

COMMITTEES HAVE CERTAIN VALUE

Mr. MARTIN. Oh, yes. I wouldn't do without advisory boards. They have their place, as Dr. von Braun indicated here this morning.

Mr. WEISL. What is your concept of the relationship between the military and industry in carrying out a development operation such as you talked about, and the part that each of them ought to play in the picture?

Mr. MARTIN. Well, my feeling, very strongly, is that in carrying out the development of our military weapons today, we need to depend very definitely upon a strong team consisting of both military and industry.

There is some tendency at times to say that industry is all-wise in this field, and that the military should turn all their problems over to the industry, and industry will carry them out for them.

I have been in industry, and I know how it works from an industry standpoint.

There are, however, certain responsibilities which the military people have which they cannot delegate to someone else. The military man is the man who is going to use these weapons when they are finished. He has got to determine what it is he wants, and how he is going to use it. He has also got to have enough skill to know how to pick competent people to do the jobs for him.

He has also got to know how to evaluate, for his own purposes, the results of that work.

Now, in order to carry out the military responsibilities in a complex technical field of this sort, the military have to have internally competent, hard-working people who know enough about the technology to bridge the relationship between what the operating military man wants in combat conditions, and what the technical laboratories and production facilities can turn out for him.

And that brings in another factor, on which you started to question me and we dropped, as to how we can make our developments more suitable for production and use while they are being developed. This is a very important factor from the standpoint of shortening this time cycle that you mentioned in your earlier question.

In the past, we have tended to look upon research, development, design for production, production and use, as separate operations in the procedure which must come in series. Now we have learned today in carrying through our programs, to carry out these separate operations not in series but concurrently. In doing that we can very materially cut down this time period. For example, during the development period, you should be working with the production contractor and get him started on his tooling, his preparation for production, while the development is still going on.

At the same time, the operational people should have close contact with the development organization so that the development man is continuously aware of what it is that the operational man needs and how he is going to use it, how he is going to maintain it, what kind of skills he is going to have available. By this concurrent or overlapping procedure, you can get much better results in much less time.

This job I mentioned earlier that I was associated with Dr. Houston on during the war, was an outstanding example of that kind of concurrence of operation.

MR. WEISL. I am sure you are right, Dr. Martin. But is that what is being done now? You heard the testimony of General Medaris and Dr. von Braun. They have not been able to get the money or the check or the funding to get Chrysler to tool up for the production of Jupiter.

MR. MARTIN. Well, they were speaking about one stage of it. They also mentioned the fact which I am very proud of the fact that they have been able to do it that during their development and while they are making experimental equipment down at Redstone Arsenal, they have had there with them the engineers of Chrysler, the organization which is going to make the production missiles. They are getting the advice of the production engineers in setting up their tooling and their processing in the experimental phases. That is going a long way toward making it possible to reduce the time in getting production going. This is a very desirable factor and is being increasingly used in the military programs.

COMPENSATION FACTOR

MR. WEISL. Very good, Dr. Martin.

You speak of getting top-level men and getting competent military men and competent civilians and competent scientific men. What can we do to get those types of individuals into the military or into Government service?

Mr. MARTIN. Well, one very important thing, of course, is the matter of compensation. And this is the thing today where in Government we are very limited in our competition with industry. We have a number of competent people in Government and in the military. We have many of them there because they are sincere, dedicated people who are willing to make sacrifices to work for the Government and for the military.

This applies not only at the lower levels of the development organization, but it also applies right up the line to the top, to the appointive officers, whom we have been talking about this morning, in Defense, in the military services. We need to have better incentives, we need to have better conditions by which to attract these people.

At the present time, at the top levels, we are pretty much limited to those people who can afford to make a sacrifice and jeopardize, in some cases, their careers. Because they have other resources, they can take on these responsibilities.

As a result of this situation—and, of course, the conflict of interest comes in here, also, to limited people who are willing to take these responsibilities—as a result of this, we get people in the top layers of the defense organization who feel that they cannot make such sacrifices for more than a year or two. That gives this short tenure which is also sometimes questioned as causing the trouble of getting the necessary background and experience to make decisions quickly.

Mr. WEISL. Dr. Martin, we have heard some testimony about interservice rivalry, and the wasteful competition that takes place in the development programs.

Should there be competition or duplication in the development of complex new weapons systems?

Mr. MARTIN. I think when we discuss a matter like this, we have to analyze it a little bit, and indicate what we are talking about.

In the early parts of a development project where we are trying to get a new device or a new weapon, new piece of equipment, it is very important to carry out on an exploratory basis what you might call applied research and exploratory development in several lines to insure we are properly covering the area.

Then, after having carried out those several lines, we should be able to analyze the several approaches and determine from them what is the best single approach to follow to go on into production.

Now, I think some of our so-called rivalry or competition has arisen because we have allowed these exploratory surveys which may be done in separate services, to go on into the hardware stage, without stopping and trying to consolidate them before they get to that point.

Once they have gotten into the hardware stage and embodiments which may be used for warfare, then you have an established position, with all kinds of opinions and pressures built up back of it, which then make it very difficult to pick one as compared to the other, because at that time you have so much organization, facilities, back of it that you hesitate to throw that away and go ahead with only one piece of hardware.

Mr. WEISL. Is there anything, Dr. Martin, that I failed to cover which you would like to tell the committee?

Mr. MARTIN. That is a pretty broad order. The areas I have discussed, about the matter of cutting down the time cycle, I think I have treated in a general way many of these questions. Of course,

there are many details involved in this. I might say this: That in considering these matters of how we do these things and what kind of an organization we set up, there tends to be a situation arising where, when we have a problem, we think the way to answer it is to have a new kind of organization.

I feel today that the potentialities of our organization have not been fully utilized, and I think we should explore, in considering how we carry on from here, as to whether we can make more effective our present organizations before we branch out into a number of new ones.

The organization itself does not settle the questions we are talking about of arriving at decisions or how we get competence.

Mr. WEISL. Thank you very much, Dr. Martin.

Mr. Chairman, those are all the questions that counsel cares to ask at this time.

Senator STENNIS. Senator Saltonstall?

Senator SALTONSTALL. Mr. Chairman I have just one question.

Mr. Martin, when you talk about high-priced men, the Congress last year and for several years now have limited the top civil-service rate men to a lower scale than what the Department wanted; am I not right?

Mr. MARTIN. Yes; this is correct.

Senator SALTONSTALL. And so your problem is pay and getting younger men who are willing to serve?

Mr. MARTIN. That is right.

Senator SALTONSTALL. Thank you, Mr. Chairman.

Senator STENNIS. I do have special questioning here, too, Dr. Martin.

You have given us some very helpful testimony, matters that had not been clearly covered by other witnesses, too.

The question I have thought about, this matter of getting adequate and competent technical personnel within the Government, you mention that now, and you solve that largely by having these contracts and also through the services of people outside, industrial research?

Mr. MARTIN. Yes.

Senator STENNIS. To what extent on a percentage basis do you have to go outside into industrial research to get this work done?

Your opinion on matters like that is worth something.

Mr. MARTIN. Well, I would rather put this the other way around if I might, Senator.

Senator STENNIS. All right.

Mr. MARTIN. As I indicated in one of my earlier answers, there needs to be in the military a certain technical competence, in order to carry out—

Senator STENNIS. Certain what?

Mr. MARTIN. A certain technical competence.

Senator STENNIS. Yes.

Mr. MARTIN. In order to permit the military organization to carry out the responsibilities which I mentioned, which cannot be delegated to anyone else, because they are the responsibilities as to what the military is going to need, how they are going to do it, and is what they get adequate for their needs?

Now in order to get that competence, you first of all have to have the proper incentives to get people to come into the work.

Secondly, in order to keep that competence alive you have to give the people more than just the job passing opinions on other people's proposals or evaluating other people's work.

You have to give them a certain amount of original work on their own to keep them interested, to keep them current with the expanding art and up to date in technology.

Now, to me this is the way you determine how much you should do internally, and this, I feel, should be far less than half of the total amount of effort.

I think we need to depend to a greater degree than we are today on the technology that is available in the universities, in the various nonprofit laboratories and in industry, industry to a large extent.

Senator STENNIS. You mean the majority of this work should be done beyond the services?

Mr. MARTIN. That is right.

Senator STENNIS. At the same time you emphasize the importance of having these men within the service and within other agencies of the Government?

Mr. MARTIN. That is right.

Senator STENNIS. Now, it seems to me that in many avenues of activity that the military is called on to perform that they get enmeshed in their own machinery and their so-called ritual and redtape.

Do you have in mind any suggested changes in existing laws that might give you, say, the Army, more freedom with reference to their own personnel or to industrial personnel?

Mr. MARTIN. Well, on the matter of personnel, I think it——

Senator STENNIS. I mean this scientific personnel?

Mr. MARTIN. Yes; I am talking about scientific personnel.

The thing that Senator Saltonstall mentioned there have been up before Congress in recent years proposals to the military people for so-called Public Law 13's.

I think last year Defense asked for 275 total——

Senator STENNIS. Do you have something definite to recommend—— pardon me for interrupting you.

Do you have something to recommend on that subject?

Mr. MARTIN. Yes. We are now making a current survey again this year. Last year a survey was made and we came up with a recommendation as to definite numbers.

We are surveying the field again right now to see what proposals we should make before the coming Congress.

Senator STENNIS. You mean you are going to ask for legislation, you are planning to ask for legislation on that subject?

Mr. MARTIN. That is my understanding; yes, sir.

Senator STENNIS. Legislation or appropriations.

Mr. MARTIN. Well, legislation. I believe that it requires legislation to increase the number of this personnel and of course it requires appropriations to pay their salaries.

Senator STENNIS. We always know appropriation requests will follow. Yes.

Mr. MARTIN. It is that——

Senator STENNIS. Well, I want to especially thank you for your very helpful testimony here, and it is obvious that the Army research team is well led, I think, and has high morale, and we appreciate very much your contribution.

If there is nothing further from counsel, if there is nothing further from the committee or from counsel, you will be excused with the thanks of the committee.

Thank you.

The committee without objection will now take a 5-minute recess. (Short recess.)

Senator JOHNSON. Our next witness is Secretary of the Navy Thomas S. Gates.

Mr. Gates, it is a pleasure to welcome you before the committee today. You have had a distinguished career which covers both business and active naval service during World War II.

The committee is well aware of the extremely important role that will be played by the Navy in the development of the weapons of the future. You have specific roles and specific assignments, and insofar as I am aware there has been no controversy about your role.

We are going to hear from you and your staff experts on the progress of the Navy's plans. We expect the testimony of your Department to be direct and to the point in the tradition of the naval commander who runs a taut ship.

In order to save time, I am having your biography inserted in the record.

(Secretary Gates' biography is as follows:)

Thomas S. Gates, Jr., was born in Germantown, Pa., on April 10, 1906.

After graduating from the University of Pennsylvania in 1928, Mr. Gates joined the firm of Drexel & Co., investment bankers. In 1940, Mr. Gates was made a partner in this firm. In addition, he has been a director of the Beaver Coal Corp., the Scott Paper Co., and the International Basic Economy Corp.

During World War II, Mr. Gates was commissioned in the Naval Reserve and served on active duty from April 1, 1942, until his release to inactive duty in October 1945.

He graduated from the Quonset Point Air Intelligence School. In the spring of 1943, he was assigned to the U. S. S. *Monterey* and served in the Pacific for approximately 1 year. In the summer of 1944, he was assigned to the staff of Rear Adm. C. T. Durgin during the invasion of southern France.

Immediately following this, he was sent back to the Pacific where he remained until the end of the war, taking part in the Philippine liberation and the Iwo Jima and Okinawa campaigns.

For his war service, Mr. Gates was awarded the Bronze Star and a Gold Star in lieu of a second Bronze Star. In December 1953 he was promoted to Captain, USNR, and placed on the retired list.

Since the war, Mr. Gates has served as a member of the Naval Advisory Council of the Bureau of Aeronautics.

Mr. Gates was appointed Under Secretary of the Navy by President Eisenhower and assumed that office in October 1953. One of his first assignments was as Chairman of the Navy Reorganization Committee. On April 1, 1957, he succeeded the Honorable Charles S. Thomas as Secretary of the Navy.

Senator JOHNSON. Will you raise your right hand, Mr. Gates?

Do you solemnly swear that the testimony you give this committee will be the whole truth and nothing but the truth?

Secretary GATES. I do.

Senator JOHNSON. Proceed, counsel, with your examination.

TESTIMONY OF THE HONORABLE THOMAS S. GATES, JR., SECRETARY OF THE NAVY

Mr. WEISL. Mr. Secretary, have you a prepared statement that you would like to read to the committee?

Secretary GATES. I have, sir.

Mr. WEISL. Will you please read it?

Secretary GATES. Mr. Chairman, my associates and I share this opportunity to present to this important committee of the United States Senate the views and current thinking of the United States Navy. We meet together under difficult and serious circumstances—at a time that is most important in our national life.

As I report to you on the state of the Navy and make certain you are informed of all the facts that pertain to our affairs, I am reminded of the enormous military changes that have occurred since I came to the Department of the Navy in 1953.

The Congress, and the members of this committee of the Senate have participated in these far-reaching changes.

Together we have seen it happen.

We know that today and tomorrow have left the past forever. It is an extraordinary period in our history, and it came upon us very quickly.

The effect has been great on everyone—so great that some take it for granted because it is not easy to grasp completely.

The effect on the United States Navy is comprehensive and final. Missiles are here. Guns are gone. Aircraft must now be supersonic. Atomic propulsion is in fleet service and we are moving toward an atomic Navy. It is a very big, expensive and difficult thing to do but it can be done, and it is essential.

A time of change is a time to get things done—these years have seen us fit the Navy into the national effort.

Always we walk a difficult line—a careful, calculated balance between immediate readiness and modernization for the future.

We have been and always will be alert. We know that the United States is faced with a tough, capable, and ruthless enemy, whose objective of world domination never varies.

To be alert and ready must have our primary attention, yet progress has come fast and been great and we must lead. This is the balance—the compromise we make. It affects every decision, every day.

We struggle with this balance because of the vital contribution we make to our defense. As a sea-based force, we add to the total United States deterrent power, and we have the responsibility of preserving the freedom of the seas which link the free world together.

It is Navy policy in everything we do to get the greatest military worth—the most military strength possible.

Dollars are not important when national security is involved. They are only a measure of manpower, materials, and effort.

As an American measure we use them. We do not consider them all important but we consider we owe it to our fellow citizens to get the most military strength for our money.

In this time of change we have made hard choices. We have divorced ourselves from the past. We have forgotten a number of the things that once were very important. We have reduced certain ships and aircraft.

We have cutback on World War II support activities. Choices of this kind will inevitably be necessary and will continue to face us. Again we face balance and decision between readiness and the new things we need and we can get.

We do this to put our chips on the things that count most: missiles, advanced aircraft, nuclear-powered ships, triphibious marines, lean, hard, and ready combat forces.

We must continue to improve our quality, especially in advanced technology, in readiness and in people. Our decisions affect people who live for long periods without bases and homes—people sharing the same ambitions and hopes and needs as anyone else. The quality and spirit of those people is our greatest resource for the future, and we must always encourage them.

In these brief minutes I have the honor and the responsibility of representing the United States Navy and discussing its policies and programs.

I want you to be sure that I have thought of the best interest of the United States, not exclusively the Navy. My associates and I believe in strong services, in a strong economy, in a strong country.

We are mindful we must not default the goal of peace while building strength. We do not pretend to know all the answers. We do pledge ourselves to work together, in an affirmative spirit, with open minds, to enhance our national strength.

As a nation, we require military power and prestige that is sufficient—

First, to make it unthinkable to any aggressor to risk all-out war.

Second, to prevent—if necessary to win decisively—anym limited war or aggression.

Third, to support the national policy in the cold war. The United States must be sure it can meet all these requirements. None can be omitted.

The Navy has no ambitions to grow bigger for bigness' sake, to do anything alone, or to make any undue claims. We do believe that our special tasks and the capabilities of the Navy and the marines are most essential.

As we appraise the threat that faces us and look ahead, it is inevitable that we must use the seas to strengthen our national deterrent power and reduce our vulnerability.

We can make a significant increase in the striking power of our sea-based systems. In a short term, we can considerably improve the volume and military capabilities of carrier aircraft strikes.

In emergencies, we can put more ships to sea, as we have in the past. This we can do in a hurry. Over a longer period we can accelerate the Polaris nuclear-propelled ballistic missile submarines, the high-performance jet seaplanes, and other sea-based weapons system.

MEASURES TO DIVERT ENEMY FIRE

These measures would not only increase the total capability of the United States, but would impose severe defensive problems on an enemy—problems that would be different, burdensome, and sometimes insoluble. Certainly they would force an enemy to divert some of his fire away from our land and our allies.

The nature of the enemy threat demands a change in emphasis, a deployment of much more of the national striking capability from land to the high seas.

We can use the high seas as a springboard for offensive operations and as a vast maneuver area for the defense in depth of ourselves and our allies. This will remove any enemy hope that our ability to strike back could be eliminated by a surprise attack.

Given a shield of mutual deterrence, power to prevent limited aggression and to win limited war becomes decisive.

Clearly this power demands combat forces in being: strong, mobile, and versatile.

We have great pride in our deployed forces—the Sixth and Seventh Fleets—the United States Marine Forces, the contribution they make to the peace and their potential in war.

To keep them strong and capable requires advanced scientific and technical development, just as much as ballistic missile war.

We have still another task that is traditional to the Navy, yet continuously renewed by the advances of science—to keep alive the freedom of the seas. The free world is an oceanic coalition. Across the seas we must provide the military, economic, and political links that cement us together.

This control of the seas is threatened as never before by the Soviet Navy, and particularly by their massive submarine forces. It is an extraordinary and challenging task to contain these submarines and to deal with their threat—a threat not only to our sea lifelines, with their missile firing capabilities, it is a threat to our heart land itself.

This is a Navy responsibility we live with. We have made some encouraging progress—but it would be very wrong to claim we have it licked.

We are taking every avenue of approach, but we must do a great deal more, especially in research, advanced technology and antisubmarine forces in being before we can be sure of success.

Ability to conduct successfully our foreign policy depends critically on military and technical prestige, which in the long term is the mirror of military reality.

Realistic military planning demands balance between military objectives, and between weapons systems to meet any single objective.

We try always to think of the future. Since World War II, the Office of Naval Research has pioneered the United States effort in research, and continues to enjoy a remarkable reputation.

Additional scientific research is essential. The scientists working in electronics and in the related fields are striking ahead. Working in the physics of the solid state, they have given us miniature electronic equipment of all kinds, running on very low power. They are giving us a means of multiplying radar detection ranges, improving communications, revolutionizing data handling—taking a decisive lead in electronic warfare.

Nuclear power is still in its infancy, yet already the *Nautilus* has written naval history—and her extended cruise under the polar icecap has dramatized the capabilities of the nuclear submarine and the importance of the Arctic.

We lead the world in nuclear power. We intend never to lose the lead.

We can help with the national effort to explore outer space.

The ballistic missile art may be revolutionized by our work in the chemistry of solid rocket propellents.

We certainly can expect setbacks and temporary failures in the future, as we have experienced them in the past. This is a part of the very nature of scientific development.

Yet we have deep confidence in the future accomplishment of our scientific teams, based on their capabilities and their sound performance. We want to encourage them, support them, and apply their results as rapidly as possible.

We take a considerable pride in our scientific record. We have not been last to recognize and support advanced science in the national interest. We have long supported, and have recently greatly expanded in the technical education of officers and especially of young enlisted men.

Dedicated young officers and men, young scientists and technicians, young sailors, marines, soldiers, and airmen are in fact our greatest military resource. We should be very sure that they can find in our armed services a worthy and attractive career.

In conclusion, Mr. Chairman:

The Navy can contribute to the future.

We can improve naval quality.

We can make great strides in missile warfare, antisubmarine warfare, control of the seas.

We can continue to support national policy with mobile strength based on the sea.

All of these things we firmly believe we should do, in the national interest.

We believe they must be done even if life as usual is interrupted and sacrifices on the part of our people are required.

Senator JOHNSON. Thank you very much, Mr. Secretary.

Mr. Counsel, will you question the witness?

Mr. WEISL. Mr. Secretary, we have had considerable evidence presented to us concerning the tremendous capability of the Soviet Union in missile developments.

What role will the Navy play or does the Navy plan to play in connection with and in relation to those great missile programs which the Soviet Union apparently has developed?

Secretary GATES. Mr. Weisl, as I said in my statement, I think the sensible thing to do for the country is to put more of our deterrent power at sea in light of these missile developments where ships and striking forces at sea are relatively immune from ballistic missile attack.

This can be done by a number of systems with which I believe the committee are familiar or will hear from later witnesses.

Mr. WEISL. We will have testimony on that subject from Admiral Burke and his staff I presume.

Secretary GATES. Yes, sir.

Mr. WEISL. Have you any testimony to give or any evidence to present which will make it possible for the Navy to make any new or added contributions toward improving our deterrent power against a potential enemy?

Secretary GATES. Yes, sir; we could as far as added power is concerned, we could enhance our carrier striking force capabilities.

As far as new deterrent power is concerned, we are working very hard on the Polaris missile system, which we propose to accelerate, which would be a completely new type of deterrent power.

Mr. WEISL. Does the Navy need additional funds to improve its program and its deterrent force and its efficiency?

Secretary GATES. I am sure it will, sir.

Mr. WEISL. And I presume your staff or Admiral Burke's staff will give some evidence in that respect to the committee.

Secretary GATES. I am sure they will answer questions here; yes.

Mr. WEISL. We have had recommendations, Mr. Secretary, from men like General Doolittle, Dr. Vannevar Bush, and yesterday from

General Gavin, concerning a reorganization of the Defense Department so that the Secretary of Defense can get independent advice in no way diluted by the interests of one particular service or another.

Would you care to give the committee some comments on that?

Secretary GATES. Yes, sir. I think that most of the problems that have been pointed up in the Department of Defense are problems involving decisions, decisions to very difficult questions.

Sometimes they do not even have any answer; they have opinion rather than an answer.

I personally believe in the present Joint Chiefs of Staff system. I do not know what good it would do to have another kind of a staff or what the difference would particularly be.

The Secretary of Defense has all the authority that he needs, and the Joint Chiefs of Staff are his advisory body.

I do not think it is unwise to sometimes have differences of opinion sharply focused by the Joint Chiefs of Staff. After all, decisions nowadays are not always military. They are political, they are economic, and they are financial and military. Difference of opinion, sharply focused, brings it to the attention of people who can make decisions and have the authority and power to do so.

I feel also that sometimes there are perhaps too many committees and too many groups with veto power without the responsibility. The real responsibility lies with the Secretary of Defense, and the services, and I feel a little differently from what seems to be the popular trend, I am afraid. I feel the service prestige should be increased.

I am sure I will be accused of self-aggrandizement when I say that I think the service Secretaries should be members of the National Security Council or the Cabinet, or both, again, the way they were once.

I think that the Secretary of Defense can expect statesmanship from his service Secretaries and should use the Secretaries as in effect his cabinet to help advise him on difficult decisions.

Mr. WEISL. You know Robert Lovett, do you not?

Secretary GATES. Very well, sir. I have a great respect for him.

Mr. WEISL. Mr. Lovett, when he left the Department of Defense, wrote a letter—

Secretary GATES. Yes, sir.

Mr. WEISL (continuing). Which he thought about very carefully, for many weeks and in that letter he stated that there was a great need for the Secretary of Defense, in passing on complex problems, to have some independent advisory board or persons to advise him on the complex problems that he must pass upon.

Do you agree with Mr. Lovett's viewpoint in that respect?

Secretary GATES. Mr. Weisl, I think Bob Lovett wrote the best papers of any I have read at the Pentagon. He is a very fine man. I do not agree with him in this connection.

The Joint Chiefs of Staff, to me, are capable and do advise in the same respect and they are directly related to the authority that they have. I feel to have a separate group further removed from authority and responsibility would just add more confusion than now exists, and perhaps would not sharply focus up the problems which, as I said in the beginning, are extremely difficult.

Mr. WEISL. Since Admiral Burke, Chief of Naval Operations, and his associates will testify directly on the operation of the Navy—
Secretary GATES. Yes, sir.

Mr. WEISL (continuing). I will defer all the questioning, Mr. Chairman, of Mr. Gates until they appear.

Senator JOHNSON. Thank you.

Senator Flanders?

Senator FLANDERS. No questions.

Senator JOHNSON. Senator Stennis?

Senator STENNIS. I have no additional questions, Mr. Chairman.

I want to thank the Secretary for a very fine statement here that I have not only listened to but I have studied some of the major points already.

Secretary GATES. Thank you, Senator Stennis.

Senator JOHNSON. Mr. Secretary, we are very pleased with the testimony you have given, and the committee thanks you for your contribution, and hopes your staff can find ways of speeding up the many promising developments that come under your Department. Thank you very much.

Secretary GATES. Thank you, Mr. Chairman.

Senator JOHNSON. The next witness is Adm. Arleigh Burke, Chief of Naval Operations.

Admiral Burke, do you solemnly swear the testimony you will give this committee will be the whole truth and nothing but the truth?

Admiral BURKE. I do, sir.

TESTIMONY OF ADM. ARLEIGH BURKE, USN, CHIEF OF NAVAL OPERATIONS

Senator JOHNSON. Admiral Burke, we welcome you to the committee and we are very pleased to have this opportunity to have your testimony.

Counsel, will you proceed with your examination. But first we will insert in the record the biography of Admiral Burke:

ADM. ARLEIGH A. BURKE

Arleigh A. Burke was born in Boulder, Colo., on October 19, 1901. On June 8, 1923, he was graduated from the United States Naval Academy.

Until July 1940 Admiral Burke served in battleships and destroyers. Also, he received the degree of master of science and engineering at the University of Michigan. From August 1940 until January 1943 he was assigned at the Naval Gun Factory in Washington, D. C. In February 1943 he received orders to the South Pacific where he successively commanded Destroyers Divisions 43 and 44, Destroyer Squadron 12, and Destroyer Squadron 23. This latter squadron covered the initial landings in Bougainville in November 1943, and fought in 22 separate engagements during the next 4 months.

In March of 1944 he became Chief of Staff to Commander, Fast Carrier Task Force 58. While serving with this carrier force, Arleigh Burke was promoted to commodore, and participated in all its naval engagements until June 1945 shortly before the surrender of Japan. He flew many combat missions. He was aboard both *Bunker Hill* and *Enterprise* when they were hit by Japanese suicide planes during the Okinawa campaign.

At the outbreak of the Korean war Admiral Burke was appointed Deputy Chief of Staff to Commander Naval Forces, Far East. From there, he assumed command of Cruiser Division 5, and in July 1951 he was made a member of United Nations truce delegation to negotiate with the Communists for a military armistice in Korea. After 6 months in this capacity he returned to the Office of Chief of Naval Operations where he served as Director of Strategic Plans Division until 1954.

In April 1954, he took command of Cruiser Division 6, and in January 1955 assumed command of Destroyer Force Atlantic Fleet in which capacity he served until he became Chief of Naval Operations in August 1955.

Admiral Burke has received numerous combat awards during his service in the Navy including the Distinguished Service Medal, the Navy Cross, the Legion of Merit, and the Purple Heart.

Mr. WEISL. Admiral Burke, have you a statement to make to the committee?

Admiral BURKE. Yes, sir, I have, sir.

Mr. WEISL. Please read it.

Admiral BURKE. Mr. Chairman and gentlemen, I welcome this opportunity to appear before this committee.

The primary task of the Navy is to maintain control of the seas, so that we can assure security for ourselves and for our allies, and help discourage and deter would-be aggressors from destroying the peace of the world.

The Navy must keep alert and resolutely modern in the urgent role she has jointly with the other services, of maintaining the deterrent capability of the United States. There is nothing aggressive nor threatening to peace-loving people anywhere in a strong American military posture. However, this posture must be capable of meeting, as well as cooling off, threats of destruction against us.

Remarkable changes have taken place in the field of science and technology in the last decade and a half. And I need hardly remind you of the revolutionary changes in naval warfare that lie immediately ahead with the beginning of our nuclear fleet.

During the past several years we have witnessed the technological advances of the Soviet Union. We have seen them develop atomic weapons, long-range aircraft, electronic devices, and a Navy second only to the United States with unprecedented numbers of submarines for a Navy in peacetime. The Soviets have told us of their efforts to educate their scientists.

However, during the time that Russia was making these advances, the United States led in all of these fields of endeavor.

The launching of Sputniks I and II came as a jolt to the American people. Here was a new frontier opened up. But we had all been planning to open up this frontier. The fact that the Soviets had been first to do it suddenly brought home the realization that we had new tasks ahead. We have been reminded once again of the need and inspiration of our rugged American philosophy that there are always new frontiers to face and to cross.

During the past several months, and before the sputniks, we have had long and searching discussions as to the best courses of action to maintain the lead in missile warfare.

The Navy will continue to scrutinize its programs and changes will be made wherever possible to take advantage of our own new technological advances and to counter new possible threats.

The most difficult problem that I have as Chief of Naval Operations is to achieve the proper balance between immediate readiness and future capability.

The Navy is frequently called upon for action now—as it was in the crisis over Suez—and more recently in the eastern Mediterranean and in the western Pacific. We cannot reduce the immediate capability of our operational forces below that which is necessary to deal with events that might involve either a local war—or a general war.

We do recognize that technology is making rapid advances—that the majority of our ships are getting old and that the new equipment which will enable us to carry out our duties and responsibilities in a war, say, 5 years or more from now, is complicated and, consequently, very expensive.

We realize the great urgency of developing better equipment and modern weapons to maintain the freedom of the seas against the threats of destruction which can be brought against us.

UNITED STATES MUST MAINTAIN CONTROL OF THE SEAS

Our whole concept of collective security is dependent upon the ability of the United States to strike its enemies with devastating power no matter what they do—and to support and to reinforce our allies. This requires that the United States maintain control of the seas, so that we can reach our allies, support and supply our own forces overseas, and destroy the enemy's military strength in his own territory.

Because of this urgent need for better equipment, the Navy has taken drastic steps to acquire the money for new ships, new aircraft, and new equipment.

We have reduced our Shore Establishment substantially. We have reduced the number of people in the Navy. We are reducing the number of ships by about 100—over 10 percent of our operating forces. We are reducing the number of operating aircraft by approximately 1,300—a heavy reduction—also over 10 percent.

These things, which reduce our immediate readiness, we have done in order to develop and acquire modern ships, modern aircraft, and modern equipment.

I would not like to imply that our immediate readiness has been decreased in numerical proportion to the numbers I have just stated. The weapons that we now have are better than the weapons we had a few years ago.

The Navy must always maintain a readiness for a general war. Our Sixth and Seventh Fleets, deployed and alert, are ready for action and in a position to move into action quickly and launch their strikes. As these fleets move into action, the remainder of our fleets would be deployed.

These naval forces contribute significantly to the total deterrent power of the United States. Their importance in the preservation of world peace is unquestioned.

It is quite obvious that Soviet intentions are to pursue rapid development of missiles, particularly long-range ballistic missiles, in addition to their tremendous strength in conventional forces, in the expectation that this course of action offers the best prospect of achieving military and psychological advantages over the United States.

We are approaching the era of ballistic missiles—and possibly a condition of nuclear stalemate. Now the United States has the capability of inflicting extensive and perhaps total damage on the military forces of any prospective enemy. We have superior destructive capability now by virtue of the Strategic Air Command, naval striking power, missiles, and tactical air. On the other hand, the Soviets now, or soon will, have a capacity of inflicting extensive damage on the United States.

MANNED AIRCRAFT STILL IMPORTANT

Long-range missiles will be an important, a very significant, addition to the arsenals of military forces. But neither ballistic nor guided missiles have replaced manned aircraft. Nor are they likely to within the next few years. We must insure that our strength is sufficient to destroy the military power of an opponent, no matter what he does or when he tries it.

Also, we must not discard those strategic concepts and weapons systems, upon which our military strength rests today, without a most careful appraisal. Particularly not until we have available and operational other proven means of accomplishing our military objectives.

A general nuclear war now means that both the United States and Russia would be most severely damaged. Under these circumstances, initiation of a general war by Russia seems unlikely so long as we have the capability of destroying her.

It is likely that the Soviets will do what they have done in the past: pursue alternate and less risky approaches to world domination. They will try to bring their influence to bear by political, economic, culture, psychological, and subversive programs. We believe that this will increase the likelihood of local aggression, which means that there is more likelihood of limited wars, and local incidents.

The Soviets apparently are convinced that this is their best approach since they are continuing to modernize their ground, naval, and tactical air forces and are equipping them with both conventional and nuclear weapons.

They continue to probe and penetrate by putting arms and supplies into the hands of people who will use them to upset existing governments or cause incidents and trouble in any part of the world. The price they exact is control of the people who accept their assistance.

Let me now turn to the future. Missiles—with powerful nuclear warheads—are of grave military significance today. But the Russian nuclear missile is not the only course of action which we must counter.

Exactly what courses of Russian action the United States will have to counter—what will happen in the future—we do not know—for sure.

But we do know that we will have to win in all the courses of action—economic, scientific, technological, psychological, and military.

Not all of the possible Russian courses of action can be countered by military strength—but many of them can. We must have the capability as a nation to function effectively in any situation which may arise. In order to control the situation we must have a wide range of military capabilities—the flexibility to do whatever needs to be done. We need a nuclear devastation capability. But the Nation should avoid channeling its military capabilities to the point where it will be forced to choose between an all-out nuclear war and a course of helpless inaction.

We know also that technology is proceeding at an extremely rapid pace—that the cost of military equipment is rising steadily—that it is necessary to keep our forces modern—and that we must do this within the funds which can be made available to us.

This means that we should strive to obtain Armed Forces possessing versatile characteristics. A principal ingredient of naval forces is their versatility.

We must have the readiness and capability to use nuclear weapons when the situation calls for the use of nuclear weapons. We must have the ability to stop less violent aggression with less drastic means. But this does not mean that we can have 1 set of forces for nuclear war and 1 set for conventional weapons. Insofar as possible, our forces must be capable of using either or both.

It is for these reasons that the Navy believes that versatility and its companion, mobility, are absolutely essential for the future as well as the present. In the missile age more of our offensive power must be truly mobile.

ACCENT ON NUCLEAR POWER

The Navy has made significant progress in the past few years. We lead the world in nuclear power. All of our future submarines will have nuclear powerplants. We are building a nuclear-powered carrier. We are building a nuclear-powered cruiser. Soon we expect to lay down a nuclear-powered frigate.

We know Russia is interested in nuclear power and she is striving hard to get nuclear power into her ships, but the United States is well in the lead.

The Navy has been very fortunate in its operational guided missiles. Our surface-to-air missiles—Tartar, Terrier, and Talos, are excellent. They are accurate and deadly. They are continually being improved. They will get even better.

Our air-to-air missiles in the Sidewinder and the Sparrow series are just as effective.

Our surface-to-surface missiles in the Regulus series are successful.

Our air-to-surface missiles are also good.

About a year ago, we decided that we could produce a small accurate 1,500-mile fleet ballistic missile with a solid propellant. When perfected, it would be more satisfactory for use aboard ship than liquid-propellant systems. This program has had the highest priority in the Navy. We established a separate organization to develop this fleet ballistic-missile system. We laid down a long-range, orderly program for it. We have recently accelerated that program. We have great expectations for this ballistic-missile system. All of the preliminary experiments and tests have met our expectations.

But a word of caution here. The fleet ballistic-missile system, also, is not yet operational. We can expect more problems before it is entirely successful. We have been fortunate so far. But it is a complex device, with many innovations—some are bound to cause trouble.

It might be desirable to point out that this ballistic missile will be launched from specially designed ships. Launched nearer to its target, it should have greater accuracy than a longer range missile. Because of its solid fuel, it should have a quick reaction time. Because it is launched from many positions on the high seas, it will divert enemy offensive effort from our own shores. It can be launched submerged. Its launching position, whether from submarine or surface ship, will be difficult to locate. It is mobile. Its launching platform is under United States sovereignty at all times.

We think Polaris weapons systems will be a significant addition to our national arsenal.

I now come to the most difficult technical problem which confronts the United States Navy—antisubmarine warfare.

Submarines have always been the favorite weapons of aggressive nations.

In World War I, Germany nearly broke the back of the Allies before the submarine menace was controlled. She nearly did it again in World War II.

Russia learned that lesson well.

After World War II, Russia spent several years in studying German, Japanese, and our own submarine warfare and submarines. German scientists were used to get all possible submarine data. Finally, in 1950, she started building submarines. Since then she has built the largest submarine fleet in existence.

She has done this because she realizes that we and our free-world allies must use the seas in order to support our own deployed forces and each other, and to carry the war to Soviet territory.

With the advent of submarine-launched missiles, there is another great danger which she presents to us. Russian submarines could devastate large areas of the United States if we cannot control the submarine menace.

This submarine problem is a grave one for the Navy and the United States.

We recognize the real urgency that is needed to solve this problem. After the last Great War the appearance of the snorkel caused us to devote tremendous scientific effort to counter that new threat. This effort by the scientists of the United States, and the development of new tactics and new equipment, enabled us to reach a position where we could handle successfully conventional-powered snorkel submarines.

But the nuclear powered submarine again gives the submarine the advantage:

We have had to renew our effort.

We have again called upon the scientists of the United States to assist us in solving this problem. We have established an anti-submarine warfare command in the Atlantic whose primary duty is antisubmarine warfare and whose responsibility it is to prevent a successful submarine attack against the continental United States.

Antisubmarine warfare is a warfare of attrition. There is no way of surely destroying all submarines.

The problem of antisubmarine warfare really divides itself into two parts. The insurance in peacetime that enemy submarines are not lurking off our coasts ready to attack—and the destruction of submarines in wartime before they can reach positions from which they can damage the United States or our naval forces.

Each day I and the other senior officers of the Navy are briefed on the suspicious submarine contacts throughout the world. We keep track of these contacts. Some of them, of course, are false contacts and others are not.

We are frequently asked, "Would we know for sure if a single enemy submarine were off our coast," and, unfortunately, the answer to that question is, "No, we would not." However, it is very unlikely a dangerous number of submarines could be off our coast without us knowing it for sure.

If any nation expected to strike the United States and do significant damage, she would have to strike many targets nearly simultaneously. If she struck just one or two targets, even though the areas in which the missiles hit would be devastated, the United States would go to war immediately and launch attacks against the attacking nation.

So it would not be sound for any nation to use too few submarines or too few bombers—or missiles in an initial attack. If a nation is going to attack the United States, wisdom would require her to attack with all the force that she could concentrate for the attack.

With barriers, antisubmarine patrols, hunter-killer forces, anti-submarine submarines on patrol, nuclear and conventional weapons, detection devices and other means, we would be able to detect any significant number of submarines before—several days before—they would be in a position to launch.

A nation would be imprudent indeed to take the chance of tipping her hand in trying to get a substantial number of submarines into launching position—unless she had control of the sea—and could do so without giving warning of her intentions.

NAVY MARSHALS FORCES AGAINST SUBS

Practically all forces of the Navy are used in one form or another, against submarines in this tremendous problem of antisubmarine warfare.

At this point, let me reemphasize that by far the toughest and most elusive aspect of antisubmarine warfare is detection—detection of the submarine that has left its base and is operating at sea.

It follows therefore that the surest way to kill submarines is to do so at their base—before they have put to sea and when they are most vulnerable to attack.

This is a primary task of our mobile carrier striking forces. To seek out and destroy not only the heavily protected fixed coastal bases, but also the mobile tenders and mother ships that will be concealed in bays and harbors.

To do this job requires not only high mobility, but the most modern striking power to get through the defensive forces.

The attack carrier is the heart and backbone of these striking forces. These carriers must be able to operate the various types of aircraft needed for this task—aircraft that must be able to get through to their objective with a suitable payload.

These include strike aircraft which have a long-range strike potential at low altitude, the most difficult type to counter.

These same carrier striking forces are also immediately available for other tasks and missions. They can employ either conventional or thermonuclear weapons. They are equipped with missiles. Their mobility gives them a unique advantage. This feature alone makes them a valuable supplement to our principal retaliatory forces.

To carry out the rest of the antisubmarine warfare campaign:

We will mine the exits and narrow channels through which the enemy submarines must pass.

We will augment the barriers.

We will have our shore-based long-range patrol aircraft searching the wide oceans.

We will have hunter-killer groups operating—constantly searching—in areas of probable enemy submarine concentrations.

We will have aircraft and ships on patrol off our own shores.

And yet, all of this is not good enough. Some enemy submarines will get through—for it is impossible to provide an absolute defense against submarines just as it is against bombers or against anything else. What we can do, if we work hard enough at it, is to make his submarine operations unprofitable—by sinking large numbers of his submarines.

But we can't do this unless we keep progressing and moving ahead. We have got to get even longer range underwater detection devices. We have to get better identification of submarines underwater.

We have to improve our ability to fire antisubmarine weapons at long ranges.

We are working on these problems and we have some ideas that show promise of success. But they are not easy problems and their solution will take time, effort, and money. As new equipment is developed, we will need to produce it and install it in our ships and our aircraft.

New equipment will come from research. We are trying to interest more scientists in the tremendously important but unspectacular work connected with antisubmarine warfare.

SIX POINTS FOR MAINTAINING SUPERIORITY

The United States now has the superior maritime strength in the world and we must maintain it to meet our present and our future national security responsibilities. In order to maintain superiority, we must:

(a) Support research and development programs, especially in anti-submarine warfare, missiles, and electronics.

(b) Emphasize the importance of antisubmarine warfare equipment, procedures, tactics, and doctrine.

(c) Improve, as much as we possibly can, our intelligence so that we may have warning of the enemy's intentions.

(d) Expedite the final development and production of the fleet ballistic missile, Polaris, to insure its earliest deployment at sea.

(e) To support shipbuilding and aircraft procurement programs sufficient to maintain effective fleets capable of occupying and controlling the sea, and providing deterrence and readiness on the spot where they may be needed.

(f) To insure the maintenance of military forces with the versatility and mobility to meet the variety of threats posed by communist power.

The Navy problems are varied and they are complex and difficult. The frontiers of the future are vast. The current situation is serious. It demands determination and great effort to insure security of our Nation.

The Navy has moved into the nuclear-missile age with competence and with a determination to make the most of the opportunity afforded to us by the United States' control of the seas.

Thank you, Mr. Chairman.

Senator JOHNSON. Admiral Burke, we thank you for your testimony and for the contribution you have made to our deliberations.

The hour is late. If counsel will proceed with the examination, we will go on now.

Mr. WEISL. Admiral Burke, as you so very ably pointed out in your thorough presentation of the Navy's strength and problems, the submarine potential of the enemy appears to be one of the greatest dangers that our Nation faces; is that not true?

Admiral BURKE. Yes, sir; I believe that to be true, sir.

Mr. WEISL. May I ask you first, Admiral Burke, do you know whether the Russian Navy has any nuclear submarines?

Admiral BURKE. We do not know, sir. We know that the Russians for the past several years have been extremely interested in nuclear power for ships. We know that they have launched the *Lenin*, an icebreaker. The powerplant we think is not yet in that ship.

We know that she fully realizes the importance of nuclear power and long, high-sustained speed underwater, so she may have a few nuclear powered submarines now. We think she does not have, but she will have some, we think, very shortly.

Mr. WEISL. At least, as far as we know, the nuclear submarine is one field in which we apparently have some lead on the Soviet Union.

Admiral BURKE. Yes, sir.

Mr. WEISL. Do you know, Admiral Burke, whether the Russian Navy has any submarines capable of launching missiles?

Admiral BURKE. Again we do not know, sir. We know that Russia is very competent in missiles. She has done very well in missiles.

We have indications, a few indications which are not conclusive, that may indicate that she has some submarines with missiles. It is not too difficult a problem to install missiles in submarines, or to construct submarines which will fire missiles, but we have no proof, no direct and positive evidence, that she now has missile submarines in existence.

Mr. WEISL. But we do at this time in our own United States Navy have some vessels that are at the present time capable of launching some missiles?

Admiral BURKE. Yes, sir, we do.

Mr. WEISL. So that again in that respect, as far as we know, the United States Navy may be ahead of the Soviet Union.

Admiral BURKE. We may be, sir. We, of course, assume that because Russia has a capability, has a capacity to put missiles in submarines, we assume that she does have them, in our estimates.

Mr. WEISL. Now, Admiral Burke, since the potential menace of the Soviet submarine strength is so great, what has the United States Navy been doing to improve its detection services so that submarines can be detected?

Admiral BURKE. Right after World War II, we had the problem of the snorkel submarine, and we asked a group of scientists to study the problem in coordination with us, to see if there was any way that we could increase our sonar capability.

As a result of those studies, we were able to increase our range of detection several times, quite a few times, and we were able to increase our weapon capability and our computation ability, so that we could handle the submarine, the snorkel submarine.

We have a scientific advisory committee, and we have had special sonar study groups studying this problem of anti-submarine warfare,

particularly detection and identification. We have put all the scientific effort, tried to interest as much scientific effort as we possibly can, into this very difficult problem. That is on detection alone.

Now, that is on ships and submarines and aircraft, all three detection devices.

Mr. WEISL. Admiral Burke, have you had sufficient funds with which to create the greatest capability that you need to detect Soviet submarines?

Admiral BURKE. No, sir. We have used our funds that have been made available to us as best we can, but we need more; we have needed more funds for research. We need more funds for the equipment after we have gotten it, to install the equipment in our ships and in our aircraft.

Mr. WEISL. Is the lack of funds a very serious deterrent to your getting the right detection and other devices to protect the United States against submarine attack by the Soviet Union?

Admiral BURKE. Yes; because research effort, production effort, is nearly directly proportional to the funds available for that effort.

Now, whether or not if we had had more funds one of the scientists would have been able to make a tremendous breakthrough in detection, we don't know, but the effort would have been greater, and the chances are that we would have progressed further.

Mr. WEISL. In other words, you have not had sufficient funds to get the greatest capability to protect the Nation against submarine attack.

Admiral BURKE. That is correct, sir. But I might add that we have never had sufficient funds to do those things in other lines of endeavor, too. And that is true, I think, perhaps in all governmental agencies.

Mr. WEISL. I know it is, but I am talking about submarine detection, which apparently the United States—against which if we don't have submarine detection and don't have the funds to get it, this country may be in grave danger; is that not true?

Admiral BURKE. Yes, sir.

Mr. WEISL. What efforts are you making, Admiral Burke, to get sufficient funds for this purpose?

Admiral BURKE. We have stated our case, both before all the agencies which are concerned with the budget, and we have also stated them before the Congress.

We have abided by the decisions which have been made. We have tried to inform the people who were making the decisions of the dangers of enemy submarines, and above all, the tremendous length of time that it takes to design, develop, and equip new ships after you get the idea, and before you can get that idea into a capability.

Mr. WEISL. Has the money which Congress appropriated been denied allocation by the Budget Director or by the Comptroller of the Defense Department?

Admiral BURKE. In order to get the money, we have to go through an apportionment procedure, which is difficult.

Mr. WEISL. Has that difficulty in the apportionment procedure affected the speed at which you could get the devices that you need?

Admiral BURKE. Yes, sir; it is very difficult to tell exactly how much, but it has.

Mr. WEISL. In connection with the appropriations that have been apportioned, has the denial of the use of overtime on the part of

contractors delayed you in getting the equipment that you needed for submarine detection?

Admiral BURKE. Yes, sir; our ships and aircraft would have come off the line sooner.

Mr. WEISL. Then the denial of overtime has affected the speed at which you get the equipment that you need?

Admiral BURKE. Yes, sir. I would like to bring out these decisions that are made by people are made with a lot more factors than just the factors which I present to them.

Mr. WEISL. I know that, Admiral.

Admiral BURKE. Yes, sir.

Mr. WEISL. But what we are trying to find out, in view of the clear and present danger that the Nation faces, whether the United States Navy has got enough funds to enable it to protect this country, and whether overtime restrictions have prevented the Navy from getting the equipment that it has to have; and you say that they have?

Admiral BURKE. Yes, sir.

Mr. WEISL. Has there been a denial of sufficient manpower for your research laboratories, such as the Naval Research Laboratory?

Admiral BURKE. There are limitations on both military manpower and civilian manpower, and those limitations do affect the numbers of people in the laboratories, and they do affect the numbers of people who can operate the equipment.

Mr. WEISL. You, I presume, are acquainted with a letter which was sent by one of the executives of the Naval Research Laboratory, pointing out that the denial of funds has impaired him in his work?

Admiral BURKE. I have not seen the letter itself, sir, but I have been informed of the contents of the letter; yes, sir.

NAVY SENDS ENLISTED MEN TO SCIENCE SCHOOLS

Mr. WEISL. What steps has the Navy Department taken to train scientists? By "scientists," I take in technologists as well as scientists, all those technical people.

Admiral BURKE. Within the military service, that is, the uniformed people, we train a good many officers in postgraduate schools, various scientific courses. In addition to that, 2 years ago we started a course for bluejackets who had not had a college education and who were especially well qualified, in the universities. We started this off as a trial run 2 years ago. It was very successful. We doubled it last year, and the Secretary has recently increased it about 5 times its original or 6 times its original size. We hope to train about 500 bluejackets a year.

Mr. WEISL. That is, you will accomplish this by paying the tuition and expenses of students who show aptitude for science and technology?

Admiral BURKE. Who are already in the service.

Mr. WEISL. Who are already in the service.

Admiral BURKE. And they extend their enlistment so that they will stay in the service. In addition to that, each of our laboratories, although it is different in each laboratory, attempts to interest especially well-qualified high-school students in the work of the laboratory, in science in general, not so much for that particular laboratory but just for science in general, and we have had a very good response to that.

Mr. WEISL. Do these potential students whom the Navy will finance have to be officers or can they be enlisted men?

Admiral BURKE. They are 500 enlisted men a year.

Mr. WEISL. Five hundred enlisted men?

Admiral BURKE. Yes, sir.

Mr. WEISL. You pay their way through scientific or engineering or technological colleges?

Admiral BURKE. Yes, sir.

Mr. WEISL. Provided that when they graduate they agree to serve in the United States Navy for a period of time?

Admiral BURKE. Yes, sir; that is correct.

Mr. WEISL. Now, in order to meet the submarine menace, and I am stressing submarines, Admiral, because that seems to be the immediate danger, not that it is the only danger or even the most important danger, but it has been written about in the newspapers and the people are tremendously concerned. Do you have a force in being now, apart from what you need?

Admiral BURKE. Yes, sir; we keep at sea patrol aircraft, shore-based patrol aircraft. We have also hunter-killer forces at sea. We have our fleets, always have an antisubmarine capability with them, and then whenever we receive any small indications that there might be submarines in an area, we make special searches.

Mr. WEISL. Do you have sufficient forces in being? You have the responsibility, Admiral. If anything goes wrong, you will be blamed, so we want to know as clearly and as effectively as you can tell us whether you have sufficient forces in being to properly discharge your responsibility in defending against submarines?

Admiral BURKE. Mr. Weisl, I suppose that every military commander in the whole world has answered that question always, "No, sir."

Mr. WEISL. I know.

Admiral BURKE. And I have not either. The more forces we have, equipped with modern equipment, the better we will be able to do our job.

Mr. WEISL. I am sure of that, Admiral, but what the committee would like to know is what we can do now to help your forces in being, to strengthen them as quickly as possible?

Admiral BURKE. More forces would increase the capabilities.

Mr. WEISL. How could the Congress, how can this committee, help you get those forces?

Admiral BURKE. It takes money, sir. It takes money and it takes an increase in our manpower levels.

Mr. WEISL. Are your fleets equipped with modern equipment?

Admiral BURKE. No, sir; not altogether. This year will see our destroyers equipped with modern sonars. It has taken 6 or 7 years. That is the active-fleet ships. We need more equipment, both electronic and sonar equipment, in both our aircraft and our ships.

Mr. WEISL. Admiral, what are you doing, what is the Navy doing, to get that equipment? Are you presenting your case?

Admiral BURKE. Yes, sir.

Mr. WEISL. Strongly?

Admiral BURKE. Yes, sir, we are presenting our case just as strongly as we know how, and that is the reason, because we made an analysis of this. We make it every year over and over again, to make sure that

we are not making a mistake, and we took some very drastic steps this year in cutting back our forces, in cutting back our men, in cutting back our Shore Establishment, in order to get money for new equipment, new ships and new aircraft, sir.

Mr. WEISL. If your destroyers and your supporting ships in the fleet do not have modern equipment, they will be at a great disadvantage against the Soviet navy, which apparently, from all reports, has modern equipment.

Admiral BURKE. Yes, sir; that is certainly correct, and there is a lot of difference in the effectiveness of a destroyer or any other unit, depending upon your equipment. In a recent fleet exercise, the difference between a ship with a modern sonar and a ship without modern sonar is the difference between success and failure. One ship can gain contact, hold it and kill; the other ship without modern equipment does not even know a submarine is there sometimes under certain conditions.

Mr. WEISL. Will you in closed session, you and your associates, tell the committee what kind of equipment is so desperately needed?

Admiral BURKE. Yes, sir.

Mr. WEISL. We have been told and our investigation discloses that the Soviet Union not only has modern aircraft itself, but has supplied aircraft to its satellite countries. You have talked about a limited war, and we presume that these aircraft would be used in a limited war against the United States if the United States were engaged.

What part would the Navy play, if any, against such aircraft?

Admiral BURKE. Mr. Weisl, we are usually called upon very early in the game whenever there is a possibility of limited engagement, and it is true that Russia has supplied Egypt, Syria, and Red China with modern equipment, modern aircraft. Now, our carriers in many instances, in some instances, are the only way to get tactical airpower into the area of trouble. That means that the aircraft we will have to use have to be capable of meeting and defeating the enemy aircraft which will be used against them, and that means modern carriers, because new aircraft are heavy and they are fast and they cannot be operated from the old World War II carriers.

Mr. WEISL. You have the 6th Fleet in the Mediterranean; is that right?

Admiral BURKE. Yes, sir.

Mr. WEISL. And you have the 7th Fleet in the Pacific?

Admiral BURKE. Yes, sir.

Mr. WEISL. Now, should trouble arise in the Mediterranean, is the 6th Fleet equipped with the most modern equipment that it can get, or would you rather discuss that in closed session?

Admiral BURKE. I would rather discuss the exact equipment in closed session, but I might say that we have some new aircraft that are coming off the line that are very good. We would like to have more of them faster.

Mr. WEISL. I think in your statement you mentioned that the majority of your ships are getting old?

Admiral BURKE. Yes, sir.

Mr. WEISL. That you need replacements. Can you tell the committee about your shipbuilding program?

Admiral BURKE. This goes back a good many years.

Mr. WEISL. About what percentage of your fleet would you say consists of World War II ships?

Admiral BURKE. About 80 percent of our fleet now are World War II ships, and by 1965, at the end of the 20-year normal life of these ships, 50 percent of our fleet will still be these World War II ships. There will come a time when those ships simply will not run any more. They will just run down. They will not be capable of operation. That means that our shipbuilding bill, our shipbuilding rate of procurement, has not been big enough. Now, partly this was because right after World War II the ships were new then. We did not need a replacement after World War II, within the next 4 or 5 years. We did not start a shipbuilding program for about 5 or 6 years. That means that the shipbuilding program should be greater than if we had started right away.

Mr. WEISL. Does that obsolescence factor apply to our submarines as well as our other ships?

Admiral BURKE. Yes, sir; except the submarine life is less than the surface life of ships.

Mr. WEISL. Would you say that 80 percent of our submarines are old submarines?

Admiral BURKE. No, sir; the submarines are a little better off as far as modernity is concerned right now than the rest of the fleet, but a good many of them are, sir.

Mr. WEISL. I will not question you in detail about the Polaris, because I understand Admiral Raborn will appear before us and discuss the Polaris in detail.

Admiral BURKE. Yes, sir.

Mr. WEISL. But we do need submarines for the Polaris?

Admiral BURKE. Yes.

Mr. WEISL. When it becomes operational.

Admiral BURKE. Yes.

Mr. WEISL. Is your program sufficiently large to be ready with submarines when the Polaris is ready?

Admiral BURKE. Our Polaris submarine program is just starting now. We are going to have to increase our rate of production of these submarines a great deal. We are going to have to have a good many of those ships within 2 or 3 years. They are going to have to be laid down. We estimate that it probably will cost around a half-billion dollars a year for several years in order to get an adequate Polaris submarine capability.

Mr. WEISL. Whatever the cost, Admiral Burke, the committee will want to find out what we need in the way of submarines to launch the the Polaris when it is ready.

Admiral BURKE. Yes, sir.

Mr. WEISL. And you will tell that to the committee, I presume, in executive session?

Admiral BURKE. Yes, sir.

Mr. WEISL. Now, in the event of an all-out war, an attack on the United States by guided missiles, bombers, or otherwise, what part would the Navy play?

Admiral BURKE. The Navy has the 6th and 7th Fleets deployed all the time, and they are ready for action at any time. The other fleets, the condition of readiness varies, but when tension increases

such as it did during Suez, two-thirds of the fleet went to sea right away and they were ready for action in a very short while.

Mr. WEISL. Consistent with security, can you tell us how many aircraft carriers are in operation today?

Admiral BURKE. Yes, sir; there are 15 attack carriers in operation now, sir.

Mr. WEISL. And do these attack carriers carry long-range bombers?

Admiral BURKE. Well, they are medium range, sir. They carry a heavy-attack aircraft, which will carry thermonuclear weapons at distances of a thousand miles or slightly more.

Mr. WEISL. Could these aircraft with thermonuclear weapons, in the event of necessity, strike the heart of Russia, in the event that we were attacked?

Admiral BURKE. Yes, sir; they could strike the heart of Russia.

Mr. WEISL. We had a great deal of discussion about mobility in connection with the launching of intermediate missiles. Do you consider the aircraft carrier a mobile base for aircraft?

Admiral BURKE. Yes, sir.

Mr. WEISL. Please tell the committee about the mobility advantage of an aircraft carrier.

Admiral BURKE. Well, in the first place, it is a most difficult target to find. It looks easy in peacetime, but even in peacetime it is a difficult target to find.

Mr. WEISL. Tell us why it is a difficult target.

Admiral BURKE. Because, first, you do not know the exact position at any time. You have to search for it, and that means a considerable effort to search a lot of ocean.

With decoys, electronic devices, jamming techniques, and other things, it is difficult to tell the difference between an aircraft carrier and other targets at sea, so that you cannot identify it.

It is difficult to identify unless you see it, and by the time a search plane gets close enough to see it, he is in very great trouble.

Now, the reason for that is that when—it is the fact that an attack cannot be launched against a carrier or a carrier task force just to go out and find a carrier task force and strike it. The striking force should have the location known before it strikes. That means they have got to launch search planes first.

The search planes, since the carriers will be protected by picket ships, heavy support ships, its own aircraft, the search planes run into hazards just as soon as they get anywhere near the vicinity of the pickets, and they are very likely to be shot down. If they are not, and they do get a position report in, then the enemy launches its strike aircraft; they come out and they have to go through a terrific defensive screen before they can ever reach a carrier; first, aircraft, then missiles, and then aircraft again, and then the missiles from the ships that are right close to the carriers.

Now, in many of our exercises some of our own people in conducting strikes against our carrier striking force will underestimate, and when they underestimate they lose completely. They don't get any planes through. It takes a terrific effort, and then they have to be very fortunate.

Senator SALTONSTALL. Mr. Weisl, would you yield for one question?

Mr. WEISL. Certainly.

Senator SALTONSTALL. Isn't that aircraft carrier going at a relatively fast rate of 32 or 36 knots all the time?

Admiral BURKE. Yes, sir; it is moving all the time, and takes advantage of weather, everything else.

Senator SALTONSTALL. So all this outfit you just described is moving at a rate of 30 knots?

Admiral BURKE. Yes, sir; it is moving at high speed, and it is changing its course frequently, so that a report of a course and speed one time is not true an hour later.

Mr. WEISL. So that an aircraft carrier can cover about 800 miles in a day.

Admiral BURKE. It can move at about 30 knots.

Mr. WEISL. At about 30 knots an hour?

Admiral BURKE. Yes, sir.

Mr. WEISL. Does an aircraft carrier play any part in antisubmarine warfare?

Admiral BURKE. Yes, sir.

An aircraft carrier is one of the most useful weapons, and the reason for that, it is much better to get submarines at their bases in the bays and the fiords.

We know that Russia has built a good many mother ships. They said so. She intends to use those ships by deploying the tenders to places which are probably not very well known to us, certainly not known now, so we are going to have to search for those places, and then we are going to have to strike them just with airpower. We are not going to get through easily.

Now, there is no other way that we can get in except with a heavy attack that can come from carriers.

Mr. WEISL. Do you have sufficient funds in the Navy to train properly your jet flyers on these carriers? I will tell you, Admiral, why I asked the question.

Admiral BURKE. Yes.

Mr. WEISL. In the course of our investigation we have been told that jet flyers get as little as 2 hours per month proficiency flying.

Admiral BURKE. Not in the carriers, sir. We do have to restrict flight hours. We have had to restrict flight hours. That is very bad.

Our jet pilots, we keep up to a minimum standard, but they frequently barely get the minimum standard and, of course, the more flight time that a man has, the more proficient he becomes, and operating close to the minimum all the time does make him a less efficient pilot than if he had more flight time.

Mr. WEISL. Admiral, don't you think it is a pretty dangerous proposition not to have enough funds to train properly our jet flyers on whom we depend to strike at the enemy and protect the security of the United States?

Admiral BURKE. Yes, sir; they are trained to a minimum amount, but it would be a lot, we feel a lot better if we could fly them more; yes, sir.

Mr. WEISL. Is it not an absolute necessity to fly them more? Is a minimum amount sufficient to train them?

Admiral BURKE. Yes, sir. The minimum amount is sufficient. When a pilot gets below a minimum amount, we don't permit him to fly.

Mr. WEISL. Well, is 2 hours a month flying for proficiency flying enough?

Admiral BURKE. No, sir.

I don't know what that report is, but there is, I am sure, something unusual about that particular report, sir.

It may be that a pilot will only fly 2 or 3 hours in a particular month due to various reasons such as illness or being in transit to a new duty station. Also there were instances reported in the latter part of fiscal year 1957 of some Naval Reserve pilots who flew such a small amount during a month. Funds to permit planned flight operations are allocated to those stations or units controlling local flying. It can occur, after periods of high flight activity, that a station may have to reduce flight operations for a corresponding period to remain within its budget. However, these are temporary reductions over short periods. Each pilot is expected to plan his flying in order to maintain prescribed minimums or satisfy specified flight syllabuses over the year.

Mr. WEISL. We heard the testimony of General Doolittle who said that one of the reasons he quit the flying service was that there wasn't enough flying time allotted.

Admiral BURKE. That is correct, sir.

You must fly, you must maintain a proficiency or you are dangerous to yourself and other people, too, sir.

Mr. WEISL. Shouldn't that point be made clear to this committee so that this committee can recommend whether its fliers are having enough training to be proficient and safe?

Admiral BURKE. Yes, sir.

We would like very much to have more flight time, and more flight time would increase our proficiency; but we are caught—if we cannot get enough flight time for all of our pilots we will have to ground our pilots, and that is what we do sometimes.

The Secretary has just given me the average flight time, average pilot time of all pilots for 1955 to 1959.

In 1955 we averaged 17½ hours per month; in 1959, we will average 14.3.

Mr. WEISL. In 1955?

Admiral BURKE. In 1955 we averaged 17½; in 1957, 16; in 1958 it is an estimate yet, 14.6; and in 1959, the estimated will probably be around 14, somewhat, about similar to 1958.

Mr. WEISL. I believe, Admiral, that General Doolittle testified that any training under 20 hours a month is insufficient and borders on the danger point from the standpoint of proficiency and safety of the pilot. Do you agree with that?

Admiral BURKE. No, sir.

I think there is a limit, there is a low limit. I don't agree with that particular number. I am not a pilot.

Mr. WEISL. I understand.

Admiral BURKE. And I would prefer to have that specific question answered. There will be instances when a man does not get enough flight time in order to keep him fully qualified but, in general, if you don't have enough flight hours to keep a man basically qualified, why, then, you would ground him—you wouldn't let him fly—and that we have had to do.

Now, I would like to say again that these restrictions in flight hours do decrease efficiency. It decreases our effectiveness.

Mr. WEISL. Don't you think it is dangerous to the national security to have to ground flyers that are needed?

Admiral BURKE. Well, it is not good for it, sir.

Mr. WEISL. Well, you will have prepared for the committee evidence on that point, so that they can, if necessary, make some judgment and recommendation?

Admiral BURKE. Yes, sir.

(Subsequently the Department of Navy filed the following memorandum with the subcommittee:)

Naval aviators can be divided into three general categories so far as their annual flight time is concerned. These categories are:

(a) Naval aviators assigned to operational duties—assignments primarily concerned with flying aircraft.

(b) Naval aviators assigned to nonoperational duties—assignments primarily administrative in nature. These aviators must maintain their proficiency while so assigned in order that they will not have to be completely retrained when they return to operational assignments and so that they can retain the "pilots' viewpoint" as they perform administrative duties that vitally concern aviation matters.

(c) Reserve naval aviators in a drill pay status—our "weekend warriors" who combine civilian life with readiness for active naval duty.

The minimum amount of flying differs for each of these categories. These are minimums that we are forced to accept due to stringency of funds and are not satisfactory.

(a) Naval aviators in operational billets.

(1) In recent years (1955-57) pilots in operational billets have averaged about 300 flight hours per year (25 hours per month). This may be further analyzed on the basis of the type aircraft flown.

(2) Pilots of jet-type aircraft averaged 230 hours in fiscal year 1956 (19 hours per month) and a little less in fiscal year 1957. The Navy will strive to keep jet pilots at about the 20-hour-per-month level.

(3) Pilots of propeller-type aircraft averaged about 360 hours in fiscal year 1956 (30 hours per month) and a little less in fiscal year 1957. Pilots of propeller-type aircraft will continue at about this level.

(b) Naval aviators in nonoperational billets.

(1) Pilots in these billets average about 100 flight hours per year (about 8.5 hours per month). A minimum of 90 flight hours per year (7.5 hours per month) has been established by the Navy as that required to maintain flight proficiency.

(c) Naval aviators in organized Reserve squadrons.

(1) A syllabus of 100 hours per year (8.5 hours per month) has been established for aviators in this category. In recent years they have averaged about 78 hours per year (6.5 hours per month). Pilots, so assigned, should maintain or better this average to retain proficiency.

Mr. WEISL. You spoke about the fact that the missile will never replace the manned bomber. "Never" is a long time, and you probably are right, but maybe you could give the committee shortly or in brief terms your reasons for that feeling.

Admiral BURKE. If I said "never," sir, you are quite right, it is too long a time.

Mr. WEISL. You may not have said "never." I may have misheard you.

SOME THINGS ONLY A PILOT CAN DO

Admiral BURKE. It will be a long time before manned aircraft will be replaced entirely by missiles. But there will be some replacement, and the reason for that is that there are a lot of things that a pilot can do that an unthinking missile cannot, and one of the most important is reconnaissance. There is no way that we have yet of having adequate reconnaissance except by manned aircraft.

Another one is precision work. A missile, even a guided missile with an excellent homing head, is not nearly as precise as a manned aircraft can be.

Another one, the most important one, perhaps, is a judgment factor. The pilot can exercise judgment in his operations. A missile cannot.

Mr. WEISL. Admiral Burke, Admiral Raborn will testify as to the Polaris, so I won't question you in detail about that; and Admiral Clark, I understand, will answer about research and development, so I won't question you about that, unless you would like to say something to the committee in that connection.

Admiral BURKE. No, sir. They will give adequate information.

Mr. WEISL. Admiral Hayward, I understand, will also testify on research and development.

Admiral BURKE. Mr. Norton, I think, will.

Mr. WEISL. I mean Admiral Hayward will testify on research and development, and Admiral Clark on missiles.

Admiral BURKE. Yes, sir.

Mr. WEISL. Is there anything further that you would like to tell the committee that I haven't asked about, Admiral Burke?

Admiral BURKE. No, sir; I think not.

Mr. WEISL. Thank you very much.

Mr. Chairman, that is all I have to ask.

Senator JOHNSON. Senator Saltonstall?

Senator SALTONSTALL. Thank you, Mr. Chairman. Just a very few questions.

Admiral Burke, do you think, as Chief of Naval Operations, there should be any changes in the Unification Act?

Admiral BURKE. No, sir. The organization as it is now designed, as it is now with the Reorganization Plan No. 6, I think is an effective organization.

Senator SALTONSTALL. Are you satisfied with the organization of the Joint Chiefs of Staff? I might add, there have been some suggestions up here for changing the organization of the Joint Chiefs of Staff. General Doolittle mentioned it, Dr. Bush, and General Gavin; and today another witness.

Admiral BURKE. I am not satisfied with the work, with the product, with the organization, even, of the Joint Chiefs of Staff, or any other organization. It can be improved. There have been a good many proposals in the past. A lot of them have been examined, and there is some merit to them in some instances.

But all in all, this organization is good, basically good, and there are a lot of reasons for that.

First, in any of these organizations, such as the National Security Council, Department of Defense, the Joint Chiefs of Staff, the Congress itself, all the big organizations who have difficult problems to solve, it depends a great deal, the solution, the proper solution of the problem depends a great deal upon the people, upon the judgment of the people, upon the knowledge and education and experience that the people who are trying to solve those problems have had.

Organizations are important, but the thing that is of primary importance is the people who are in them, the people who make them work.

Now, in any big organization, it does not matter much whether it is in business or any other organization, the flow lines on a chart are never exactly followed. The organization actually operates depending upon the personalities of the various people that are in the various spots.

Senator SALTONSTALL. Well, broadly speaking, then, you do not think any legislative action is needed on the Unification Act? You

think it is a question of personalities and working it out with personalities rather than changing the fundamental law?

Admiral BURKE. Yes, sir. I haven't seen a proposal yet that I think would solve the problems which confront the Joint Chiefs.

Senator SALTONSTALL. Are you satisfied with the present roles and missions as defined?

Admiral BURKE. Yes, sir. As far as—you mean now as a Chief, or as the Chief of Naval Operations?

Senator SALTONSTALL. I am speaking to you as Chief of Naval Operations, and also as an individual.

Admiral BURKE. Well, the Navy's roles and missions are all right. There are still areas that perhaps can be clarified in missile warfare that exist between the Navy, between the Army and the Air Force, but those are problems, the solution of which will be evolved.

Senator SALTONSTALL. Is there enough overall authority now in the Secretary of Defense, in your opinion, to accelerate a program, as desired, and to give overall direction to the three armed services?

Admiral BURKE. Yes, sir. He has authority to modify, direct as as he pleases, sir, within the limitations put down in appropriations and such things.

Senator SALTONSTALL. So there again, it is a question of personality, and using the authority that he now has?

Admiral BURKE. Yes, sir.

Senator SALTONSTALL. Just 1 or 2 other questions.

We talked, you talked a minute ago about the number of submarines and the number of new submarines. The question of new submarines has been somewhat held up, has it not, pending the decision as to the effect of the *Nautilus*? Is that a fair statement?

Admiral BURKE. Yes, sir. It has been, because there have been tremendous improvements. The *Nautilus*, the *Albacore*, these improvements have come along fairly fast, and it is not wise to build too many submarines when you can see improvements in the next—or too much of anything if you can see improvements in the next year or so that will make a significant difference in the capabilities of the equipment.

But now those have been incorporated, and we think that submarines that we are producing now are extremely good.

Senator SALTONSTALL. And the fact that we have fewer submarines, and that is public knowledge, than the Soviets have, is not a sign of weakness in our Navy, but rather a sign of a different mission for our Navy; is that correct?

Admiral BURKE. That is correct, sir.

Russia has a completely different naval problem than we have. We have to use the seas for us to be successful.

We have got to use this Atlantic Ocean and the Pacific Ocean in order for us to do anything in Europe or the Far East.

We have got to use them and we have got to have the power to use it no matter what happens.

Now Russia on the other hand is a land where all of her interior lines are land lines. She does not have to use the seas but her big purpose in naval warfare will be to defy us to use the seas, to prevent us from reaching Europe and Asia.

In order to do that she should build a lot of submarines, inshore combat craft, destroyers, torpedo boats and that sort of thing, and that is exactly what she has done.

Now, the difference is that we have to not only control the seas and use the seas, whereas all that she has to do is to deny us the use of the seas, and it takes two entirely different types of navies to do those entirely different functions.

Senator SALTONSTALL. On the other hand, as has been brought out before this committee, the submarine can be used today for launching a missile against continental United States, can it not? That is one of the problems the Navy has, to stop that?

Admiral BURKE. Yes, sir.

We have missile-launching submarines and we have to be able to stop Russia's submarines from reaching anywhere near our coast.

Senator SALTONSTALL. Now it is also true, is it not, that our submarine detective methods and instruments have been enormously improved since World War II.

Admiral BURKE. Yes, sir. Our sonars have increased. The ranges have increased several times. Our electronic radar devices have increased many times.

We have other new systems which permit us to pick up submarines by methods we did not have during World War II.

We have increased but we have not yet reached the stage where we feel confident that we can handle a large number of nuclear-powered submarines with their high sustained underwater speeds.

We are going to have to do more work on that.

Senator SALTONSTALL. And the Navy today is becoming more and more satisfied that the nuclear-powered submarine is submarine of the future; is it not?

Admiral BURKE. That is right.

Senator SALTONSTALL. As well as the nuclear-powered cruiser and destroyer?

Admiral BURKE. Yes, sir, the nuclear-powered submarine, I think we will never build another conventional powered submarine.

Senator SALTONSTALL. Admiral, I know our time is short tonight and my good friend on the right here has said to slow down a bit and I will because I know we all want to get home and I am sure you do.

Let me ask you just one more question on missiles.

Now one of the primary functions of this committee is to determine if the missile programs cannot be accelerated.

In your opinion, are the new orders given by Secretary McElroy, giving Mr. Holaday more power over missile development satisfactory, is it sufficient in your opinion?

Should there be more, and if so, what?

Admiral BURKE. Well, as nearly as I can gather, Senator, he has the power to do anything he wants to do with missiles.

He can start, stop, change—I think he has plenty of power.

Now if somebody disagreed with what he proposed to do, I am sure that they would take difference of opinion directly to the Secretary of Defense but I think that he has complete authority, and I don't see how he could use any more, sir.

Senator SALTONSTALL. And there is not undue waste from the competition angle?

Admiral BURKE. No, sir.

Senator SALTONSTALL. Up to the present time?

Admiral BURKE. No, sir; it has been a very short time, sir, but there does not seem to be any, sir.

Senator SALTONSTALL. Thank you very much, Admiral Burke.

Senator JOHNSON. Senator Stennis?

Senator STENNIS. Admiral Burke, I have been very much interested in your statement. I will be very brief here in the interest of time.

I want to put this question now: Your missile program has been separated from that of the Army. Without passing on the merits of anyone else's missile program, has your program been able to move along faster or better because it was separated and put out on a separate mission, your missile program, the Navy missile program?

Admiral BURKE. Yes, sir.

You mean the ballistic missile?

Senator STENNIS. Yes, sir.

Admiral BURKE. Yes, sir. We think it has been better since we separated it because we were trying to marry the different requirements of our two services and it became a very complex sort of system but I might say when we were working with the Army in Jupiter we have never had any better cooperation.

They were excellent.

They kept us fully informed. They did everything that we could think of to have done, and their cooperation was very good, but they could use very effectively the liquid propellant.

They could use a big missile, the size of the missile would not make very much difference to them.

We, as soon as we got far enough along in solid propellants to indicate we had a possibility of success in solid propellants and could make a small missile that could go just as far and do just as much, we asked if we could develop that missile and were granted permission to do so.

Senator STENNIS. So up to a stage the work was all in common and you pulled out after it got to where you had a special project of your own to fit your needs.

Admiral BURKE. Yes, sir; although we are kept very well informed. I think there is very good exchange of information among the services on their missile programs.

Senator STENNIS. What new facilities, if any, have you had to develop because of your separate programs, new facilities?

Admiral BURKE. We have not had to develop any new governmental facilities, sir.

We have had contractors of course, but no governmental facilities.

Senator STENNIS. Well, has that involved any heavy expenditures, these new facilities?

Admiral BURKE. No, sir, no sir; we think actually the missile being produced will be quite a bit cheaper than any other types of missile.

Senator STENNIS. Your statement here on page 10 of the mimeographed copy—I don't know what page it is for you.

Admiral BURKE. Yes, sir.

Senator STENNIS. But all of that statement pertains to Polaris.

You wind up by saying, "We think Polaris weapons system."

Admiral BURKE. Yes, sir; that is correct, sir.

Senator STENNIS. But all the preceding paragraphs there have related to Polaris; is that correct?

Admiral BURKE. Yes, sir.

Senator STENNIS. Very well, that is all I have, Mr. Chairman.

Thank you, Admiral Burke.

Admiral BURKE. Thank you, sir.

Senator JOHNSON. Admiral Burke, we thank you for the testimony and the contribution you have made to the deliberations of this committee.

The committee will stand in recess until 9:30 Monday morning.

(Whereupon, at 6:10 p. m. the committee was adjourned, to reconvene at 9:30 a. m., Monday, December 16, 1957.)

INQUIRY INTO SATELLITE AND MISSILE PROGRAMS

MONDAY, DECEMBER 16, 1957

UNITED STATES SENATE,
PREPAREDNESS INVESTIGATING SUBCOMMITTEE,
OF THE COMMITTEE ON ARMED SERVICES,
Washington, D. C.

The subcommittee met, pursuant to recess, at 9:30 a. m., in room 318, Senate Office Building, Senator Lyndon B. Johnson (chairman of the subcommittee) presiding.

Present: Senators Johnson (Texas), presiding, Kefauver, Stennis, Symington, Bridges, Saltonstall, and Flanders.

Also present: Senators Bush and Barrett, members of the Committee on Armed Services;

Edwin L. Weisl, chief counsel; Cyrus R. Vance, counsel; Gerald Siegel, associate counsel; Solis Horwitz, associate counsel; Daniel F. McGillicuddy, associate counsel; Stuart P. French, associate counsel; Edwin L. Weisl, Jr., assistant special counsel; Dr. William Houston, consultant; Dr. Homer Joe Stewart, consultant; and Edward C. Welsh, staff adviser.

Senator JOHNSON. The committee will come to order.

Before resuming the hearings this morning, I would like to make a brief announcement for the information of the committee and others.

Over the weekend, I have reviewed the material gathered by the staff. It indicates that our record will not be complete without a further presentation of testimony from industry groups and an amplification of testimony already given by the Defense Department.

During the course of the day's hearings, I am going to confer with the members of the committee in an effort to set a date for the next series of hearings. I hope it can be arranged for a time early in January.

I believe that all who have followed the hearings so far will agree with me that they have been very revealing. They have disclosed a situation in which a dedicated group of men have been working hard to develop physical weapons of security but have been hampered by confusion stemming from many sources.

I would like to stress once again that the objective of the committee is to find positive steps that will produce the weapons of security faster and more effectively. Testimony of the past few days has been very helpful in this respect.

It seems to me evident that we have the brainpower, the resources, and the dedicated enthusiasm to get the job done. Our problem is to channel those qualities into the most effective path.

Today we are going to hear the experts of the Navy, who I hope come to us with plans for expediting their end of the program.

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Our first witness this morning is Lt. Gen. Verne J. McCaul, Acting Commandant of the Marine Corps.

General McCaul, we have long recognized the historic importance of the Marine Corps. Your service has managed to adapt itself to the technological changes of military history. Our country is fortunate that you have that capacity. We are proud of the role that you have played.

Will you please stand and be sworn, General?

Do you solemnly swear that the testimony you give this committee will be the whole truth and nothing but the truth?

General McCaul. I do.

Senator JOHNSON. General, we are delighted to have you as the witness this morning.

Counsel, will you proceed with the witness?

(The biography of Lt. Gen. Verne J. McCaul is as follows:)

LT. GEN. VERNE J. MCCAUL, UNITED STATES MARINE CORPS

Lt. Gen. Verne James McCaul, a veteran marine flier, and twice winner of the Legion of Merit for outstanding service in World War II, is now serving at Marine Corps Headquarters, Washington, D. C., as Assistant Commandant of the Marine Corps.

In World War II the general saw action in the Battle of Midway, the northern Solomons, and the southern Philippines. He first earned the Legion of Merit as executive and operations officer of Marine Aircraft Group 22 when it won the Presidential unit citation for its heroic fight at Midway. The other Legion of Merit was for outstanding service in the Philippines from February to July 1945, as deputy commander, Marine Aircraft Groups, Zamboanga; commander, Support Aircraft; and commander, Marine Aircraft Group 12. That group was awarded the Presidential unit citation, in part of its service under General McCaul while supporting Filipino guerrilla units fighting on Cebu Island. In addition, Marine Aircraft Groups, Zamboanga, won the Navy unit commendation for its support of the United States Eighth Army on Mindanao and in the Sulu Archipelago while the general was deputy commander.

General McCaul was born August 18, 1903, at Ayr, N. Dak., where he attended public schools until he entered the preparatory school of the North Dakota Agricultural College, where he obtained his degree. Commissioned a marine second lieutenant, July 21, 1925, he was ordered to the Marine Barracks at the Philadelphia Navy Yard, where he completed the Basic School for Marine Corps officers that December.

In October 1927, after a tour of duty at the Marine Barracks, naval station, New Orleans, La., the general was assigned to the Marine detachment aboard the aircraft carrier *Saratoga*. He returned from sea duty in December 1929, to enter flight training at Pensacola, Fla., and after winning his wings, was ordered to Aircraft 2 at the naval air station, San Diego, Calif., in August 1930. He remained there until March 1935, then served for 3 months aboard the U. S. S. *Langley* during fleet maneuvers. After that he was stationed at Marine Barracks, Quantico, Va., from June 1935 until May 1936. The following month he began a 2-year tour of duty in the Virgin Islands.

General McCaul returned to Quantico in June 1938, and after completing the junior course in the Marine Corps Schools, remained there as assistant operations and air liaison officer of the First Marine Brigade. With that unit he participated in Caribbean maneuvers from January to March 1940, and from October 1940 to February 1941. He was named executive officer of Bombing Squadron 1, First Marine Aircraft Group, in March, 1941, and after serving briefly in that capacity at Quantico, joined the Second Marine Aircraft Group in Hawaii that June. The following month he took command of Marine Fighter Squadron 221, which was assigned to the U. S. S. *Saratoga* when the Japanese struck Pearl Harbor.

Within 24 hours of the attack the general and his squadron were ordered to Wake Island with a force sent to aid that island's hard-pressed defenders. However, because of the hopeless situation there, the relief expedition was ordered to turn back and General McCaul, with the squadron, was transferred

from the *Saratoga* to Midway Island. There the squadron joined Marine Aircraft Group 22 and General McCaul became executive officer of the group.

Following the Battle of Midway, General McCaul joined Marine Aircraft Group 23 in August 1942. He also served briefly as a liaison officer with the commander in chief, Pacific, before returning to the United States that October for duty in Washington on the staff of commander in chief, United States Fleet.

In April 1944, he was ordered from Washington to Cherry Point, where he became executive officer of the 9th Marine Aircraft Wing. He served briefly in that capacity and for a short time as commander of a fighter group at Congaree Field, S. C., before returning to the Pacific theater that October to serve as chief of staff, air, northern Solomons. He took command of Marine Aircraft Group 12 in February 1945, and after commanding that group in the Philippines and at Peiping, China, returned to the United States in March 1946, to become chief of staff of the 1st Marine Aircraft Wing at Cherry Point.

In July 1947, General McCaul entered the National War College at Washington. He graduated in June 1948; then served on aviation duty with the Office of the Chief of Naval Operations for a year before he was assigned to the joint strategic plans group of the Joint Staff in July 1949. He then took command of Marine Air Reserve training at Glenview, Ill., in August 1951.

In August 1952, the general returned to Washington to serve a year at Marine Corps Headquarters as Director of Information. Ordered to Korea the following August, 1953, he served there as assistant commander of the 1st Marine Aircraft Wing until March 1954, when he became commanding general of the wing. He returned to the United States to take command of the 2nd Marine Aircraft Wing at Cherry Point in October 1954.

Following this assignment, he assumed duties as commanding general, aircraft, Fleet Marine Force, Atlantic, on December 27, 1955, at Norfolk, Va., meanwhile retaining command of the 2d Wing until he was relieved the following month.

General McCaul assumed the position of Assistant Commandant for Air and Director of Aviation on April 1, 1957, and on the same date received his promotion to lieutenant general. He assumed his present position on December 1, 1957.

In addition to the Legion of Merit with combat V and gold star in lieu of a second, General McCaul's medals and decorations include the Presidential Unit Citation Ribbon with 2 bronze stars, the Navy Unit Commendation Ribbon, the American Defense Service Medal with base clasp, the Asiatic-Pacific Area Campaign Medal with 3 bronze stars, the American Area Campaign Medal, the World War II Victory Medal, the China Service Medal, the National Defense Service Medal, the Korean Service Medal, the United Nations Service Medal, the Philippine Liberation Ribbon with 1 bronze star, and the Chinese Order of the Purple Cloud and Banner.

TESTIMONY OF LT. GEN. VERNE J. McCAUL, USMC, ACTING COMMANDANT, UNITED STATES MARINE CORPS

Mr. WEISL. General McCaul, would you be good enough to tell the committee what your responsibility and authority is in the Marine Corps at this time.

General McCAUL. I have just recently been appointed Assistant Commandant, air. I am the Executive Director of Aviation for the Marine Corps, and at the moment I am Acting Commandant, inasmuch as General Pate is in the Pacific on an inspection trip.

Mr. WEISL. Would you be good enough to talk into the microphone, General, so that everyone here can hear you?

General McCAUL. I thought I was getting on the air. I am Assistant Commandant for the Marine Corps and Acting Commandant in the absence of General Pate, who is out in the Pacific on an inspection trip.

Mr. WEISL. Thank you, General. Is there a statement, General, that you would like to read to the committee?

General McCaul. I have a brief statement which I would like to read to the committee.

Mr. WEISL. Would you be kind enough to read it, please?

General McCaul. My presentation on behalf of the Marine Corps will be brief. In the first place, we are not deeply involved in the type of missiles which are the principal concern of this inquiry.

Secondly, unlike the larger military services—

Mr. WEISL. General, if you will pardon the interruption, I believe Senator Saltonstall is particularly interested in your presentation, and, if you will be kind enough to wait so he may hear your statement, I will appreciate it.

General McCaul. Thank you, sir. I will start over again, if I may.

My presentation on behalf of the Marine Corps will be brief. In the first place, we are not deeply involved in the type of missiles which are the principal concern of this inquiry.

Secondly, unlike the larger military services, the Marine Corps does not maintain technical bureaus or services for the development of military hardware.

For development, we rely principally on the technical bureaus of the Department of the Navy or the technical services of the Army, contributing both funds and personnel in support of projects in which we have an interest.

The Marine Corps determines its requirements and develops the military characteristics of the weapons and equipment it needs in the performance of its military functions. Having formulated these characteristics, we shop around to determine what agency is in the best position to develop a particular item. Once this agency is selected and the project undertaken, we monitor development, consulting with and assisting the developing agency.

For example, Lacrosse, which was originally conceived by the Marine Corps, is being developed by Army ordnance. After development, we test the item and accept it as is or request modification to insure that its performance is satisfactory. Marine Corps general procurement follows this same pattern. Of the material purchased for the Marine Corps, approximately 61 percent is purchased for us by the Army, 23 percent by the Navy, and 1 percent by the Air Force, with only 15 percent being purchased directly by the Marine Corps from contractors. These arrangements have worked to our satisfaction, and we plan to continue them.

The Marine Corps requirements for, and use of, missiles are determined by its military functions, as set forth in the National Security Act. Briefly, these are to provide landing forces for the fleets and provide forces-in-being ready on a moment's notice to move to any trouble spot. These expeditionary forces, specifically designed to effect a landing from the sea against opposition of any character, have the truly impressive strategic mobility of the fleets themselves and, with the support of the fleets, a great capacity for independent action. They are an indispensable element of this Nation's ability to conduct military operations on and from the sea. In addition, they are the principal mobile force in readiness to deter and to oppose the type of ambiguous threats to our security which only the Kremlin seemingly can so skillfully devise.

Paradoxically, sputnik and the other Soviet advances in weapons technology, far from reducing the probability of such limited war threats, actually increase them. The massive nuclear capabilities of both the United States and the Soviet Union serve to prevent the posing of situations which could lead to mutual extinction. The Kremlin bosses must walk with care—even as they did when the United States enjoyed a monopoly of atomic weapons—but the Soviet Union's attainment of a competent nuclear capability will give it greater freedom of action.

Senator SYMINGTON. Mr. Chairman, may I ask, has the witness got a copy? If he is going to have a long written statement, I would like to have a copy of it so I can follow it.

General McCaul. Sir, we should have many copies here.

Senator SYMINGTON. Thank you very much. I have one now. It was not in front of my desk. I beg your pardon.

General McCaul. Our natural reluctance to unleash the total war which would result in our destruction as well as that of the Soviet Union gives the Communists greater latitude in both political and limited military action. These are not new tactics. Actually they have been the keystone of modern Communist expansion: political action combined with limited military action. They are tactics that are particularly suited to the present framework.

It is for these reasons that the role of the Fleet Marine Forces has never been more significant than it is today. During recent months these forces have been deployed globally in support of national policy. Quietly and without fanfare, they have exerted a reassuring and stabilizing influence in such farflung locations on the Eurasian rimland as the eastern Mediterranean, Persian Gulf, Indian Ocean ports, the Philippines, Okinawa, and Japan. And they have done it without the difficulties so often associated with basing troops on foreign soil, and done it in areas where to base forces locally is either impracticable or impossible.

What are the missile requirements associated with these statutory functions? The Marine Corps, of course, has no requirements for the ICBM. Neither do we have any requirement for the IRBM. But we are vitally concerned that the Navy have long-range ship-based missiles, such as Regulus and Polaris, capable of assisting in the neutralization phase of landing operations.

The primary characteristic of missiles for the landing force is mobility: We must be able to take them aboard ship, land them by helicopter or across the beach, and finally employ them ashore. They must have a high degree of battlefield mobility, which simply means a weapon we can readily move, supply, and employ under battlefield conditions.

We have, now in use in the Fleet Marine Force, the first mobile surface-to-air missile system in the free world. This system, built around the Navy Terrier missile, gives us a missile capability now, and will provide the organization and skills for expansion.

What about range characteristics? With today's weapons and today's tactics, the landing area is much more extensive than formerly. Enemy troops and installations within a radius of several hundred miles may be able to interfere with the landing. As I said before, we do not need nor do we want anything approaching the 1,500-mile range of the IRBM. Neither could such a weapon be designed to satisfy

the amphibious mobility characteristics which will always constitute a limit on the weight and range of landing force weapons. If support of this nature is required, it can best be provided by supporting naval forces. But within the limitations which are implicit in our primary criterion, amphibious mobility, we will exploit the range growth potential of the weapons we now have and of those we hope to get in the future.

TYPES OF MISSILES NEEDED

- With the military characteristic of amphibious mobility as a primary consideration, the landing forces has a requirement for all four general types of missiles: Surface-to-surface, surface-to-air, air-to-air, and air-to-ground. And with respect to all types, our position is gradually improving.

As I stated at the outset, all of the missiles we now have or expect to get come from either Army or Navy sources. They are modified as required to meet the peculiar needs of the Marine Corps. Of the Army missile programs which were presented to you earlier, the Marine Corps has requirements for the Lacrosse and Hawk. We now have Honest John in operational units, to be replaced by Little John if the latter weapon develops satisfactorily.

The Terrier, which we now have in operational status, is a Navy missile, as are also our present and projected missiles in the air-to-air and air-to-ground categories. Our marine fighter aircraft are either equipped with or programmed for the air-to-air Sidewinder or the Sparrow—weapons of high kill probability.

More deadly and longer range versions of these are in the mill. For close air support of ground troops, a specialty of ours, we plan to use the Bullpup, in the development of which marine project officers in the Bureau of Aeronautics are closely working with the Navy. The status of these missile programs will be described in the Navy presentation to follow.

In closing, I would like to make an observation which seems of transcendent importance to us. In meeting the new threat posed by Soviet advances in long-range missiles, this country must not think in terms of missiles alone. To concentrate upon missiles to the exclusion of other important weapons is to harm our cause and play into Soviet hands.

A framework, within which both the Soviet Union and the United States have the capacity to destroy each other by long-range weapons, gives the Soviet Union not less but greater freedom of action in the pursuit of its normal tactics for achieving greater dominion. These tactics are political action combined with limited military action. And we must improve our capacity to deter and counter this type of activity.

So while our major concern at this time is missiles, let us not forget that other weapons must be improved also in any adequate program to respond accurately and fully to the Soviet advance in long-range missiles. It is not, in my opinion, sufficient that we strengthen the roof of our house against an avalanche while leaving the foundation and sidewalls open to slow but deadly erosion.

Mr. WEISL. Thank you very much, General McCaul.

I would like to ask a question in connection with the last 2 sentences, or rather, the last 2 sentences in the last 2 paragraphs that you read.

I point out that a framework within which both the Soviet Union and the United States have the capacity to destroy each other by long-range weapons give the Soviets a great advantage.

We must improve our capacity to deter and counter this type of activity.

Will you tell us briefly how we should improve our capacity to deter this type of activity?

General McCaul. I believe my statement had reference to the limited war capability, and not the deterrent capacity.

Mr. WEISL. Then you also state that we must not merely improve the roof of our house against an avalanche while leaving the foundation and sidewalls open to the inroad of termites.

Would you like to expand on that and tell us briefly some detail?

General McCaul. That is a colloquialism, I guess, but we feel that this Nation needs a balanced military force, and that there are many requirements in a balanced force.

We feel that ready forces are certainly one of those requirements, and of course the Marine Corps is by definition a ready force.

Mr. WEISL. General, you have described very well the role and mission that the Marine Corps is preparing for and will be called upon to carry out in the event of war. Do you have your own research and development division?

General McCaul. We do not, sir.

Mr. WEISL. Excuse me?

General McCaul. Pardon.

We have a small research and development agency within the Marine Corps, and our research and development pertains to those items of hardware which we cannot get from other sources.

We also, out of that research and development division, provide funds for projects in which we are interested.

Mr. WEISL. Funds for projects with what, sir?

General McCaul. Projects in which we are interested. We provide the funds to both the Navy and the Army.

Mr. WEISL. Does the Marine Corps have any advisory committees or ballistic missile committees?

General McCaul. Not as such, sir.

Mr. WEISL. Whenever you need new weapons, you call upon whom to get those weapons?

General McCaul. The Marine Corps determines its requirements, and then shops around through the Navy and the Army to see if anything suitable is available. If it is, we contribute personnel and funds to that project. If it is not entirely suitable, we use our best efforts to get it modified to suit Marine Corps requirements.

Mr. WEISL. Judging from your success in the past, and the successes we all know you will achieve in the future, you have gotten along without committees and without an extensive research and development program, have you not?

General McCaul. That is essentially correct.

Mr. WEISL. Has the Marine Corps adequate facilities or funds to equip itself with the modern weapons necessary to perform its mission?

General McCaul. Sir, I do not believe the Marine Corps could ever be said to be happy unless it was fully manned, fully trained, and fully equipped. But we are able to do our job, as we are proving day after day, with what we have, although we have not either the strength or the equipment we would like to have.

Mr. WEISL. Well, what strength and equipment would you feel you ought to have in order to have the capacity to properly perform your role and mission in the interest of the national security?

General McCaul. Our commandant, General Pate, has taken the position, as a result of much study by the Marine Corps, that it takes 215,000 marines to have an optimum Marine Corps.

However, also he has stated that within the personnel strength of 200,000, plus or minus 5,000, we can have a quite adequate Marine Corps.

We have had that strength. We, as you know, are losing some of it.

Mr. WEISL. You do have that strength now?

General McCaul. We have had it.

Mr. WEISL. What do you have now, sir?

General McCaul. We have now about 194,000.

Mr. WEISL. Are there any other suggestions or recommendations, General, that you would like to make to this committee that you think this committee ought to hear?

General McCaul. I believe not this morning, sir.

Mr. WEISL. Thank you, General.

Mr. Chairman, that is all the questions I have.

Senator JOHNSON. Thank you, General McCaul.

Senator BRIDGES?

Senator BRIDGES. General, do you believe, as General Gavin did, that nuclear weapons are now conventional weapons?

General McCaul. No, sir. We cannot believe in the limited war theory and give complete credence to the view that we will use atomic weapons in every contest.

Senator BRIDGES. Would you not, in the case of a limited war, use atomic weapons?

General McCaul. We are prepared to do so, Senator.

Senator BRIDGES. But you do not consider them conventional weapons. Are they not accepted now as an ordinary method of warfare?

NOT AXIOMATIC THAT ATOMIC WEAPONS MUST BE USED

General McCaul. They certainly are accepted as an item in our military arsenal, but I do not think that it is axiomatic that we must always use them.

Senator BRIDGES. No.

At any rate, you would use all different conventional weapons, as you know a conventional weapon, would you not?

General McCaul. I think in any war we will certainly use our conventional weapons, all of them. However, I believe that atomic weapons are in a different category insofar as limited war is concerned.

Senator BRIDGES. From the standpoint of national——

Senator SYMINGTON. Excuse me.

Would you repeat the answer? I did not quite understand what your last answer was to the distinguished Senator from New Hampshire.

General McCAUL. Insofar as limited war is concerned, I believe that atomic weapons are in a different category from conventional weapons.

Senator SYMINGTON. I thank the Senator.

Senator BRIDGES. Then you are not ready yet to accept the use of atomic weapons as conventional weapons in the case of limited war?

General McCAUL. Certainly I would accept them, if authority or the requirement came to use them, but there have been many situations in which it certainly has not been expedient to use them in the past. Perhaps that will be true in the future.

Senator BRIDGES. I do not agree at all that we should not have used them sometimes in the past.

Now, General, let me ask you this: From the standpoint of national military policy and national security, would you give the highest priority to the development of the intercontinental ballistic missile or to those measures which would give the United States the control of outer space?

General McCAUL. Sir, that is a little out of my field, because I am not expert in either area. But from my limited knowledge, I believe the two are combined. Outer space and intercontinental ballistic missiles seem to go hand-in-hand.

Senator BRIDGES. Well, for the objectives which we seek, which are the security and survival of this country, do you put the development of intercontinental ballistic missiles as the top priority?

General McCAUL. I believe I would have to say "yes" to that, sir.

Senator BRIDGES. Thank you.

Senator JOHNSON. Senator Stennis?

Senator SALTONSTALL?

Senator SALTONSTALL. Thank you, Mr. Chairman.

Just one question, General.

We all appreciate what the marines are doing, and their primary objective as an amphibious mobile force.

What you want, as you have no logistic, creative logistic, force of your own are the best and most modern weapons; and today missiles come in that category, that is correct, is it not?

General McCAUL. Yes, sir.

Senator SALTONSTALL. And you are primarily interested in those types of missiles that will help to make the amphibious force more useful and stronger?

General McCAUL. Yes, sir.

Senator SALTONSTALL. And those missiles have got to be mobile because your use for them is essentially a question of mobility?

General McCAUL. Yes, sir. That is the paramount requirement.

Senator SALTONSTALL. You are satisfied that you have got some missiles today in operational status and that you are hopeful from your prepared statement that you are going to get even better ones as time goes along?

General McCAUL. Yes, sir; that is absolutely correct.

Senator SALTONSTALL. And the Marines are capable of using those which are now in operational status.

General McCaul. Yes, sir; we are capable of using the Honest John, and the Terrier, which are ground-launched missiles and of course our air missiles, the Sparrow and the Sidewinder.

Senator SALTONSTALL. Your men are trained to use those instruments today?

General McCaul. Yes, sir.

Senator SALTONSTALL. And those which are not in the operational but in the development stage, are you training men to use those also?

General McCaul. I would like to defer to my Deputy Chief of Staff for Research and Development on that question.

General Shaw. We certainly are.

Senator JOHNSON. Will you supply your name for the record?

General McCaul. That is Brigadier General Shaw.

Senator SALTONSTALL. Mr. Chairman, I don't want to be too technical or quibble. He did make a statement. I don't know whether you want to swear him or not.

Senator JOHNSON. General, will you stand, please.

Do you solemnly swear that the testimony you give this committee will be the truth, and the whole truth?

General Shaw. Yes, sir.

(The biography of Brig. Gen. Samuel R. Shaw is as follows:)

BRIG. GEN. SAMUEL R. SHAW, USMC

Marine Brig. Gen. Samuel Robert Shaw, a Naval Academy graduate who saw action at Pearl Harbor and Okinawa in World War II, is serving at Headquarters, Marine Corps, Washington, D. C., as Deputy Chief of Staff, Research and Development.

The general, who was an enlisted marine before entering Annapolis, was a company commander at the Marine Barracks, Pearl Harbor Navy Yard, when the Japanese struck on December 7, 1941. In 1945 he commanded the 6th Pioneer Battalion, 6th Marine Division, at Okinawa, winning the Legion of Merit with Combat V in that campaign. He also served in that capacity and as assistant chief of staff, G-4 (logistics), of the 6th Marine Division at Tsingtao, China, earning the Bronze Star Medal for meritorious service there in October and November 1945.

General Shaw was born on June 6, 1911, at Cleveland, Ohio. After graduating from high school at Dayton, Ohio, he enlisted in the Marine Corps on September 15, 1928, and was appointed to Annapolis from the ranks in July 1930. He graduated from the Academy on May 31, 1934, with his commission as a marine second lieutenant.

In June 1936, after completing the Marine Officers' Basic School at the Philadelphia Navy Yard and serving a year of sea duty with the marine detachment aboard the United States ship *Tuscaloosa*, the general joined the 5th Marines at Quantico, Va.

He sailed for Pearl Harbor in October 1940, to command Company A at the marine barracks there. He was a captain when the United States entered World War II.

After the Japanese attack, the general served as post adjutant of the Marine barracks at Pearl Harbor until he returned to the United States in May 1943, as a lieutenant colonel. That July he was named assistant chief of staff, A-3 (operations and training), of the Fleet Marine Force, San Diego, Calif., area. He served in that capacity until he entered the Army Command and General Staff Course at Fort Leavenworth, Kans., in August 1944. Completing that course in October 1944, he departed for the Pacific theater the following month to take command of the 6th Pioneer Battalion. He held that command until October 1945, when he landed with the battalion at Tsingtao. There he was appointed assistant chief of staff, G-4, of the 6th Marine Division (later redesignated the 3d Marine Brigade, then the 4th Marines (Reinforced)).

Returning from China in September 1946, General Shaw was assigned to Quantico for duty on a special board which did research and prepared legislation concerning the postwar role of the Marine Corps. He remained on that board until

January 1949 when he was ordered to Washington, D. C. There he saw service as research officer in the Organizational Research and Policy Division, Office of the Chief of Naval Operations; as shore party officer in the Engineer Section at Marine Corps Headquarters; as a member of the Navy Department Management Survey Board, and as Chief of the Joint Action Panel in the Marine Corps' Division of Plans and Policies. He left Washington in February 1952 to become senior Marine Corps representative on the Joint Amphibious Board at Little Creek, Va., where he remained until July 1953.

In August 1953, the general returned to Quantico as a member of the advanced research group at the Marine Corps Educational Center. He served in that capacity until June 1954, when he was ordered to Korea. The following month he joined the 1st Marine Division there and served until July 1955, when he returned to the United States and was transferred to Headquarters, Marine Corps, Washington, D. C., to assume duties as Director, Policy Analysis Branch. In June 1957 he was reassigned as Deputy Chief of Staff, Research and Development. He was promoted to his present rank on November 1, 1957.

In addition to the Legion of Merit with Combat V and the Bronze Star Medal, General Shaw's medals and decorations include the Presidential Unit Citation; the American Defense Service Medal with Base Clasp; the Asiatic-Pacific Area Campaign Medal with two Bronze Stars; the American Area Campaign Medal; the World War II Victory Medal; the China Service Medal; the National Defense Service Medal; and the Chinese Order of the Cloud and Banner, 4th grade.

TESTIMONY OF BRIG. GEN. SAMUEL R. SHAW, DEPUTY CHIEF OF STAFF FOR RESEARCH AND DEVELOPMENT

Senator SALTONSTALL. So your statement, General, was, that the Marines are being trained, to operate those missiles that are now in the development stage as well as to operate the missiles that are in the operational stage?

General SHAW. Yes, sir.

Senator SALTONSTALL. I have no further questions, Mr. Chairman.

Senator JOHNSON. General, what range missiles do Marines need to perform in any or all of their missions?

General McCAUL. On the surface-to-surface missiles, I believe we would accept a missile that can adequately handle targets adjacent to our objective area, let's say missiles in the range category of 15-20 miles.

Senator JOHNSON. Do you have the missiles that are necessary to perform the missions that you are assigned?

General McCAUL. We have either on hand or order the missiles which will satisfy our requirements.

Senator JOHNSON. General, you testified that the research and development weapons work for the Marine Corps is being done essentially by the other services; is that correct?

General McCAUL. Yes, sir.

Senator JOHNSON. Now, assuming this is satisfactory to the corps, and I gather that it is, would you favor a single agency to develop weapons for all the services?

In other words, if the services can develop them for the corps, could not a single agency develop them for the other services as well?

General McCAUL. We do not believe that.

We believe that the service that knows best about the requirements should develop the missile.

Senator JOHNSON. Why, then, would not you be developing your own missiles?

General McCaul. Well, it so happens that there are missiles in being or being developed by other services that fit our requirement, and as we are part of the Naval Establishment the Navy is our prime contractor or developing agency.

Senator JOHNSON. It seems to me a little inconsistent to assume it is all right for others to develop the missiles for you, but it would not be all right for them to develop the missile for another service.

General SHAW. Perhaps I can expand on that, sir.

Senator JOHNSON. All right, General Shaw.

General SHAW. When our peculiar requirements are not met by the other services, then we proceed to develop those. We shop among the weapons which the others have, and if they can be made suitable for us we then suggest the necessary modifications.

The larger services also have their own peculiar requirements and can hardly divorce themselves from the responsibility of developing their own as we in essence do by assuring ourselves either that their weapons will fit us, or, if not, that we can develop our own.

Senator JOHNSON. But you do not think a single agency should develop for all the services?

General SHAW. No, sir; I do not.

Senator JOHNSON. Have you developed any weapons of your own in the missile field?

General SHAW. No, sir; we have not.

Senator JOHNSON. Senator Flanders?

Senator FLANDERS. I have no questions.

Senator JOHNSON. Senator Symington?

Senator SYMINGTON. Senator Stennis is back.

May I yield to him?

Senator STENNIS. I have no additional questions.

Thank you, Mr. Chairman.

Senator JOHNSON. I called Senator Stennis.

Senator SYMINGTON. I know you did, Mr. Chairman.

Senator JOHNSON. Senator Symington?

Senator SYMINGTON. General, I have been very interested in your testimony.

At the bottom of page 2 you have a paragraph starting:

Paradoxically, sputnik and the other Soviet advances in weapons technology, far from reducing the probability of war threat, actually increase them.

General McCaul. Yes, sir.

Senator SYMINGTON. And then you go on to explain why.

The premise is, of course, that we have the ability for all-out retaliation ourselves; is that right?

General McCaul. Yes, sir.

Senator SYMINGTON. The Congress appropriated money for 215,000 marines in 1955; is that correct?

General McCaul. I believe that is correct.

Senator SYMINGTON. And how many have you now?

General McCaul. We have about 194,000.

Senator SYMINGTON. Have you read a book by Henry Kissinger called Nuclear Weapons and Foreign Policy?

General McCaul. I have not read it, Senator. I am generally familiar with his comments.

Senator SYMINGTON. In that book he describes three kinds of war, conventional war, tactical atomic war as he calls it, and all-out war.

General McCAUL. Yes, sir.

Senator SYMINGTON. Is your testimony before this committee this morning that the only type and character of war that the Marines are equipping themselves for is conventional war?

General McCAUL. Oh, no, sir.

We have a very good atomic capability throughout the Marine Corps.

Senator SYMINGTON. Are you preparing to use something along the lines of, I forget the word—perhaps “pentomic” units, that the Army has?

General McCAUL. Ours are somewhat similar; yes, sir.

Senator SYMINGTON. So the testimony you gave to Senator Bridges does not mean you are not preparing as rapidly as possible for the Marines to be able to utilize atomic weapons in either limited or tactical atomic war?

Is that correct?

General McCAUL. We have an atomic capability now, and we certainly are increasing that as fast as we are able to do so.

Senator SYMINGTON. One other point. You would like to see your range of missiles limited to 15 or 20 miles?

General McCAUL. We want no limitation on them, but the weapons, our surface-to-surface weapons at the moment, I think have a maximum range of around 20 miles.

Senator SYMINGTON. Since 1942 people have been firing ballistic missiles with a range of 175 to 200 miles.

If you are limited to 15 or 20 miles in 1957, how could you be effective against a land mass of any kind, if the other people had the longer ranges?

That is what I don't understand.

General McCAUL. Our naval forces will have the longer range missile, and it is very difficult in our opinion to get an IRBM that has mobility necessary to come across the beach.

Senator SYMINGTON. An IRBM is generally considered 1,500 miles?

General McCAUL. Yes.

Senator SYMINGTON. I was not going that far. I was talking about something 100, 200, 300, 400 miles.

You believe that you should rely on the fleet for that type and character of support when the Marines land?

General McCAUL. Yes, sir.

Senator SYMINGTON. Would not it be pretty difficult to bring a fleet in as close as two or three hundred, four or five hundred miles say against the Russian land mass with their gigantic defensive air strength?

General McCAUL. The fleet has certainly put us ashore many, many times and came in and kept us ashore there with requisite naval weapons.

Senator SYMINGTON. I only want to have my mind clear.

For instance, suppose you have a task force in the east Mediterranean, which therefore we do mean you would not be many miles from the border of Russia. You also have, in the Adriatic, Albania which in effect bisects the whole Mediterranean from its center. With

those conditions present, suppose you move, against one of the countries of the Middle East, due to some unfortunate political occurrence.

Do you believe that you could be supported at that point by the fleet with say 100- to 200-mile missiles?

General McCaul. We should have our own aviation at that time, which certainly has an atomic capability, and we cannot afford in the Marine Corps all the weapons we would like to have, and so we are embarked on a program of the tactical-type missiles such as I mentioned, supported by air.

Senator SYMINGTON. Nobody has more respect for the Marines than I. The Army has a missile and a mission for years, of 200 miles; and are rapidly getting a missile of considerably more distance.

I don't want to labor it. I want to be clear.

Is it your testimony you don't need a missile in the Marine Corps beyond 15 or 20 miles?

General McCaul. No; we would like to have one of longer range but there is none on the market at this moment.

Senator SYMINGTON. Thank you, General.

Senator JOHNSON. Counsel?

REDSTONE LACKS MOBILITY MARINES NEED

Mr. WEISL. General, there is a missile on the market, so to speak, called the Redstone of 175-mile range.

Since you say that you shop around the services, why can't you get the Army to put that into your requirements?

General McCaul. We have looked very carefully into that missile.

It has not the mobility that we require.

Senator JOHNSON. And you do not agree with General Gavin and General Medaris that it does have the mobility of artillery?

General McCaul. Sir, I believe that the mobility that he is talking about applies to the Army but it certainly does not apply to the Marine Corps.

Senator JOHNSON. Doesn't the Army have to protect its areas and its position on land when it is opposing the enemy?

General McCaul. Yes, sir, but the Army does not, I believe, envisage dragging this weapon over the beach in landing operations.

Senator JOHNSON. After you land you have to protect your landing areas; don't you?

General McCaul. We have in Terrier and in Honest John and—

Senator JOHNSON. We are talking of missiles of the range of 175 miles that the Army is developing which is called the Redstone. I ask you if the Marines could not use that to good advantage, in the event that the targets that the Marines are meeting are at least 175 miles away, as Senator Symington has pointed out.

General McCaul. If it had sufficient mobility so we could use it, we would certainly like to have it.

Senator JOHNSON. General Gavin supported by General Medaris testified that the Army is accustomed to mobile weapons, that that has been it's business, and that this weapon does have the mobility of an artillery piece.

Assuming that testimony to be true, could you use that kind of a weapon?

Would you need it?

General McCaul. If that testimony—if it has the requisite mobility I am certain we could use it.

Senator JOHNSON. Did you observe the pictures that were displayed here when General Gavin testified, showing missiles on tractors that the Russian Army had which were mobile in his opinion and which had ranges of from 50 to 200 miles.

General McCaul. I have seen those pictures; yes, sir.

Senator JOHNSON. Do you agree with the estimate of the mobility of those weapons?

General McCaul. Yes, sir.

Senator JOHNSON. Could not the Marine Corps use weapons of that nature?

General McCaul. Again we go back to the subject of mobility, and we do not believe that they are mobile enough for our purposes.

Senator JOHNSON. But if they were mobile enough for Army purposes, would not they be mobile enough for your purposes when you are defending a land mass after you have landed?

General McCaul. No, sir.

Mr. WEISL. Thank you, sir.

Senator JOHNSON. General, what you are testifying to is that in your opinion the Navy will handle the long-range missiles for the Marine Corps?

General McCaul. Yes, sir.

Senator JOHNSON. And it is pretty difficult for the Marine Corps to storm ashore with these larger missiles, and that the Marines presently have the missiles that they feel that they need to perform the mission that is presently assigned to them?

General McCaul. Yes, sir.

Senator JOHNSON. And that is a missile with a shorter range?

General McCaul. Yes, sir.

Senator JOHNSON. Do you have any other testimony you would like to give the committee, General?

General McCaul. No, sir; not this morning.

Senator JOHNSON. Thank you. You have been a very informative witness. We are delighted to have heard you. We thank you for coming here.

Our next witness is Mr. Garrison Norton, the Assistant Secretary of the Navy for Air. Mr. Norton's biography reads as follows:

Mr. Norton is Assistant Secretary of the Navy for Air.

He was born in Chicago, Ill., in 1900. He graduated with a bachelor of arts from Harvard in 1923 and is a certified public accountant.

From 1923-40 he was a member of the staff and later a partner and general partner in the accounting firm of Arthur Young & Co. He was Deputy General Manager, Home Owner's Loan Corporation, Washington, 1934, and Assistant Chairman, Civil Aeronautics Authority, Washington, 1938.

He saw active duty in the United States Navy as an Aviator from 1940-45. He was Chairman of the Naval Air Advisory Council.

He was appointed Deputy Director, Office of Transport and Communications, Department of State in 1945; United States delegate, Civil Aviation Conference, Bermuda, 1946; in charge of negotiations for settlement of United States-British Bases Agreement, Bermuda, 1946; United States representative, Civil Aviation Conference, Paris, 1946; and United States delegate, first assembly, Provisional International Civil Aviation Organization, Montreal, 1946.

Mr. Norton was appointed Director, Office of Transport and Communications, Department of State, in 1946.

He became an Assistant Secretary of State in 1947; and during the following year was Chairman of the Air Coordinating Committee; chairman, international meeting on Marine-Radio Aids to Navigation, New York and New London, 1947; Chairman of the United States Delegation First Assembly, International Civil Aviation Organization; Chairman of the United States delegation to the International Plenipotentiary Tele-Communications Conference.

He was a Director of the Export-Import Bank in 1948 and a Deputy Director of the International Bank and Monetary Fund during the same year.

In 1949 he entered the banking firm of William A. M. Burden & Co. in New York as special partner.

He resigned to accept an assignment with Mr. Burden as consultant (research and development) to the Secretary of the Air Force in 1951. From 1952 to 1955 he was a consultant to the Secretary and Assistant Secretary of the Air Force (Research and Development).

He was appointed Assistant Secretary of the Navy for Air in 1956.

Mr. Norton, we welcome you before the committee as a man who has had actual experience in naval aviation. We would be pleased to take your testimony.

Would you raise your right hand, please. Do you solemnly swear that the testimony you give this committee will be the whole truth and nothing but the truth?

Mr. NORTON. I do, sir.

Senator JOHNSON. Counsel, will you proceed with the examination of Secretary Norton?

Secretary Norton, would you like to read a statement to the committee?

Mr. NORTON. Yes, I would, sir.

TESTIMONY OF HON. GARRISON NORTON, ASSISTANT SECRETARY OF THE NAVY (AIR)

Mr. NORTON. Thank you, sir.

Senator SYMINGTON. Do you have a copy.

Senator JOHNSON. I should like to ask the witnesses, if they are reading from prepared statements, to supply the staff with a sufficient number for each Senator. I should like to ask the staff to attempt to anticipate the witnesses and inquire of each witness if he has a prepared statement, so that it is not only given to the committee but is also made available to the press.

Mr. NORTON. Mr. Chairman, shall I proceed?

Mr. WEISL. Please proceed, Mr. Secretary.

Mr. NORTON. Gentlemen, I would like to make my prepared statement brief, in order that we may come as rapidly as possible to the specific points of committee interest in the field of my responsibility.

Historically and traditionally, the Navy has been wedded to technology. Naval effectiveness is nourished by and is dependent upon the Navy's broad and solid foundation in the sciences. Consider the scope of the Navy's responsibilities for warfare. We must be able to fight in any quarter of the globe; we must operate on the sea, under the sea, above the sea, on and above the shores bordering the sea. We must use a whole spectrum of weapons, ranging from a marine's rifle to a thermonuclear bomb. We must cope with localized conflicts; we must maintain control of the seas; and we must play a significant role in the deterrence of general war.

I cite this versatility and flexibility of the Navy to emphasize the role that research and development must play, and has played in the

past, on the readiness of our Navy to do its job. Our research effort must and does include all fields of science and engineering. The naval research organization, responsive to the needs of the operating forces, has sustained our accelerating pace of weapon sophistication. I must reemphasize the two-way street of understanding and responsiveness that exists in the Navy between the operating forces and the research and development organization. Neither is insulated from the other; both are joined in common effort.

EXCHANGING RESEARCH FOR MORE HARDWARE IS FALSE ECONOMY

Fortunately, the Navy, with its background of dependence on technology, has been able to resist the tendency to make first cuts in research, when cuts are necessary. We have a keen appreciation of the false economy inherent in reducing the support of basic and applied research in order to buy more hardware. Opening new vistas of knowledge, and the development of new weapons that evolve from these breakthroughs, are of paramount importance for the survival of our country. This is a view I have held ever since World War II, and I have done my best to promote that view in the three areas of Government where I have served since the war; namely, the Departments of State, Air Force, and Navy.

The many-faceted needs of the Navy for weapons of great variety make it doubly important that we apply the best of analysis, the best of organization, the best of planning to insure that we achieve the right balance between readiness today and readiness in the future. Our planning must be farsighted if we are to gain the greatest increase in capability per dollar invested.

I have devoted a great deal of effort to strengthen the Navy's research and development organization. I feel that we have made excellent progress in arriving at an organization that can cope with present circumstances. We view and direct naval research and development as an entity, not as a large number of diverse projects. Our programs, covering as they must a very wide field, are established on an integrated list. This list covers basic, supporting, and weapon research. Our weapon-research programs are listed on a priority basis, not an easy task when one must equate such things as nuclear reactors, antisubmarine surveillance systems, vertical takeoff fighter, or new-type flamethrowers for the Marines.

Our priority list stems directly from the long-range plans as developed by the Chief of Naval Operations. This list is under constant test and review. We must be always satisfied that we are tackling first things first.

As you can see, these relative priorities establish money requirements, requirements for work in Government laboratories, work in universities, work in industry. We must balance these requirements against the basic and applied research programs, to which it is not possible to assign priorities.

It is gratifying that recent world events have served to validate the soundness of the Navy's research programs, since little change in relative priorities or in balance of emphasis appears to be needed. More funds we do need, in my opinion, and I trust we shall develop this subject as your committee proceeds.

NAVY HAS HAD CONTINUED SENSE OF URGENCY

The point I want to emphasize here is that our most immediate problems in naval research and development have been with us for some time, and have not sprung full blown from sputnik. Admiral Burke has already spoken to you of the technological advances we are striving for in antisubmarine warfare, missiles, electronics, and nuclear power. Nobody has pressed the panic button in our Navy, but the sense of urgency is not something new to us.

Probably our toughest problem in the research and development area, beyond obtaining the funding level we would like, is that of retaining our experienced scientific and engineering personnel. We have not been able to cope with the economics of the recent past. The rate of turnover appears to be improving slightly at the moment, which is encouraging. The action last week of the Civil Service Commission in approving a pay raise for certain categories will help. I would like to see more significant steps taken, beginning with adoption of the Cordiner recommendations.

In this connection, I want to emphasize the importance of pooling our scientific resources to the greatest possible extent with the enormous reservoir of research talent in Europe. I have long held strong views on this subject, reinforced by visits to Air Force and Navy research contacts in Europe. There is something about European education and environment that breeds good research. That our country has benefited tremendously from this fact in the past is apparent to anyone who looks at the list of key scientists in our Manhattan project. I have made it a personal crusade to increase the interchange of basic research information between scientists of the free world, and have repeatedly joined forces with my counterparts in the Army and the Air Force in attempts to remove obstacles holding back, and sometimes damming, the stream.

From a broader view, I feel that the most important long-range problem with which we are faced is the attitude of the youth of our country toward scientific careers. Secretary Gates' recent approval of a plan to establish college training in the scientific fields for selected naval enlisted personnel is a step in this direction. We hope many other organizations will take similar steps. All of us, to the limits of our positions, must take such actions as are necessary to change the present philosophy, and we must do it now.

Ten years ago we could truthfully have claimed that we were ahead of Russian scientific research in every major discipline. We can no longer make that claim. The future of the free world will depend upon the extent to which we pool our scientific talent while tremendously increasing our own program of scientific education for selected young men. I am quoting here from previous speeches on this subject, for I have developed this theme ever since my State Department days, when I became convinced that development of our foreign policy largely on the idea that we had a monopoly of the atomic weapon would be a serious, a possibly fatal, mistake.

Mr. WEISL: Thank you, Mr. Secretary. Now, you have testified about the necessity of having the research and development program in each department of the military; is that correct?

Mr. NORTON. Yes, sir.

Mr. WEISL. Now, we today have a research and development program in the Department of Defense. This research and development program has various departments, has it not?

Mr. NORTON. The research and development program to which you refer, Mr. Weisl, I think, is the program administered by the Assistant Secretary of Defense for Research and Engineering. Is that what you refer to?

Mr. WEISL. Yes, sir.

How many departments has he under him?

Mr. NORTON. Well, he has a staff of people working under him, but the research and development departments of each of the services does not come under the Assistant Secretary of Defense.

Mr. WEISL. Now who is in charge of the research and development program of the Department of Defense?

Mr. NORTON. The Secretary of Defense.

Mr. WEISL. Well, who is specifically charged with that responsibility?

Mr. NORTON. The Assistant Secretary of Defense for Research and Engineering.

Mr. WEISL. Who is that?

Mr. NORTON. Dr. Foote.

Mr. WEISL. How many committees are there under him, approximately?

Mr. NORTON. Offhand, Mr. Weisl, I don't know. I do know that—

Mr. WEISL. Well, approximately?

Mr. NORTON. Dr. Foote has been taking a look at the organization in his office, he has been appointed fairly recently.

Mr. WEISL. I know.

Mr. NORTON. I don't know what his program really is.

Mr. WEISL. Mr. Secretary, I am not asking about his program, I am asking whether you know how many committees approximately serve under Dr. Foote, the Director of Research and Engineering?

Mr. NORTON. No, sir; I don't.

Mr. WEISL. Well, are there more than five committees?

Mr. NORTON. I would think so; yes, sir.

Mr. WEISL. Is there not another department in the Department of Defense concerned with research, a department or a service of research and development, rather than research and engineering?

Mr. NORTON. They both come under the same man.

Mr. WEISL. Now the Navy has its department of research and development.

Mr. NORTON. That is correct, sir.

Mr. WEISL. Who is in charge of that?

Mr. NORTON. I am in charge of the administrative aspects of that. I act, of course, for the Secretary of Navy who is really in charge and has delegated to me his responsibility in that field.

Mr. WEISL. Who is the naval officer in charge of that?

Mr. NORTON. The Director of the Office of Naval Research, Adm. Rawson Bennett, performs a very important role in our research effort.

Adm. John T. Hayward, the Assistant Chief of Naval Operations for Research and Development, also performs a very important role on the operating side.

Mr. WEISL. How many committees are there in the Navy advising the research and development department?

Mr. NORTON. I think it would be a little difficult to enumerate the committees advising, on it, Mr. Weisl.

Mr. WEISL. Are there more than five?

Mr. NORTON. I would say, the number depends on how you define the role here. Each one of our bureaus conducts some research and development. The Office of Naval—

Mr. WEISL. How many bureaus are there?

Mr. NORTON. Well, I should correct my last statement, I did not mean to imply that every one of our bureaus conducts research and development.

The Bureau of Aeronautics does, the Bureau of Ordnance does, the Bureau of Ships.

ONE RESEARCH ORGANIZATION IN NAVY

Mr. WEISL. What I am trying to get at is how many research organizations are there in the Navy?

Mr. NORTON. There is one.

Mr. WEISL. And under that one there are research, separate research organizations, in these three departments that you have mentioned.

Mr. NORTON. No, sir, there are no separate research organizations in the Navy.

Mr. WEISL. What are those research departments in those bureaus and offices?

Mr. NORTON. I would be glad to outline to you the research setup, is that what you are asking us to do in setting up the research setup in the Navy?

Mr. WEISL. In your statement you made clear how you organized it.

But what I was trying to do was to break it up and see through how many facets this research organization goes into each department of the military.

We have one in the Department of Defense, that one in turn has committees.

We have one in the Navy. That in turn has departments in the different bureaus as you pointed out, which in turn have committees, each of the bureaus has committees?

Mr. NORTON. No, sir.

I don't want the record to show here that I have said that the Navy Department's research organization is a mass of committees, each one dealing with the next committee. That is not the case. The Navy's research organization is as tight and close an organization as we can make it.

Now it is a big job, Mr. Weisl, and we think we are organized to handle it. If you would like me to describe to you in detail how we are organized to do that job I would be glad to do that.

Senator JOHNSON. Mr. Counsel, if I could interrupt.

I would like for the Secretary to tell us what the organization is before he defends it too enthusiastically.

Mr. WEISL. Do you want me to proceed?

Mr. NORTON. Thank you, Mr. Chairman, I would be glad to do that.

Senator JOHNSON. You have been trying to find out what the organization is?

Mr. WEISL. The Secretary, it seems to me, has taken the position it is a good organization, it is a fine organization, it has done a good job.

Senator JOHNSON. Well, that may be true. We don't dispute that. But counsel is trying to find out what the organization is.

Mr. NORTON. I would be very glad to.

May I have a moment to describe it?

Mr. WEISL. I would like to do it—I am sure the committee will be interested in your conclusions.

As I view my job, I am supposed to get the facts on which your conclusions are based.

I know that you believe, and we will undoubtedly or probably believe that you are right, but we want to know what the facts are.

Now, how many research departments do you have?

Mr. NORTON. One.

Mr. WEISL. Well, how many research—you testified that the different bureaus have their research department.

Under the main research department?

Mr. NORTON. The job that we do, Mr. Weisl, takes a lot of men.

Mr. WEISL. Do you have research departments of any kind in the bureaus of the Navy?

Mr. NORTON. Each bureau that I have mentioned to you, that is those 3 bureaus, each 1 of those does considerable research and development.

The research and development that those three bureaus do——

Mr. WEISL. How many bureaus are there?

Mr. NORTON. Let me see, the number of bureaus in the Navy, I think, are seven.

Mr. WEISL. So that they have seven departments of research?

Mr. NORTON. No, sir.

Mr. WEISL. There are three bureaus conducting research?

Mr. NORTON. Yes. Three doing considerable research-and-development work.

Mr. WEISL. What bureaus are those that conduct research?

Mr. NORTON. Aeronautics, Ordnance, and Ships.

Mr. WEISL. Very good.

How many committees does the Navy have in the research department? Approximately. I don't want the exact number.

Mr. NORTON. I can't answer that, offhand.

We might have any number of committees dealing with individual problems.

These committees might have representation from the Office of Naval Research from any 1 of the 3 bureaus, from my office.

Mr. WEISL. Then you do not know exactly.

Mr. NORTON. Offhand, I don't know the number of committees; no.

Mr. WEISL. Now, you testified that you believe that each department of the military, that the Department of Defense should each have a separate research and development organization?

Mr. NORTON. Yes, sir; I believe in that.

Mr. WEISL. In what respect is the research and development organization of the Department of Defense different from the research and development organization of each branch of the service?

Mr. NORTON. The research and development organization of the Department of Defense is what you might call a monitoring organization.

It is their primary responsibility to see to it that the actual research done by the three services does not overlap or duplicate, and furthermore that there is complete communication between the three services as to what they are doing.

So that each service gets the maximum help from the other department.

That is the primary role of Dr. Foote and his staff.

Mr. WEISL. In other words, the Department of Defense is a coordinating organization.

Mr. NORTON. That is primarily it; yes, sir.

Mr. WEISL. Do they have a separate organization of scientists and engineers working under them?

Mr. NORTON. They have some scientists and engineers; yes, sir.

Mr. WEISL. Do they have committees working under them?

Mr. NORTON. They have committees; yes, sir.

Mr. WEISL. Do they need scientists and engineers and committees to coordinate the work of the Navy, Army, and Air Force?

Mr. NORTON. I would leave that question as to what they need—

Mr. WEISL. I want your opinion, Mr. Secretary.

Mr. NORTON (continuing). To Dr. Foote. I do not think I am really testifying before this committee as to what Dr. Foote needs. However, in my opinion, I would say he very definitely needed the assistance of scientists and engineers in order to do a proper coordinating job in research.

Mr. WEISL. Does the Department of Defense have its own laboratories?

Mr. NORTON. I know of no laboratory proper directed by the Department of Defense.

Mr. WEISL. Does it have a relationship with university laboratories?

Mr. NORTON. It is possible that there may be some direct contracts by the Department of Defense with university laboratories. I do not know of any.

Mr. WEISL. As a coordinating agency, would they need these facilities to coordinate the work of the Army, Navy, and Air Force in research and development?

Mr. NORTON. I would say as a general rule, no; I should not think they would need to make direct contact with universities to do that job.

Mr. WEISL. You consider the Naval Research Laboratory one of the best and one of the oldest research laboratories in the military service; do you not?

Mr. NORTON. I do.

Mr. WEISL. And you respect the opinion of the men who work there?

Mr. NORTON. Yes, sir; I do.

Mr. WEISL. We have received a letter from the Superintendent of Aeronautics of that Laboratory who states as follows:

It is my opinion that the military have strayed too far from their primary job of defense in which they are users of research and research products, and are attempting to prescribe the research that is to be done and even to direct the research itself. On both counts the military are incompetent to do the job.

Now, that comes from Dr. Homer E. Newell, Jr., of the Naval Research Laboratory.

Do you agree with that conclusion?

Mr. NORTON. I have the greatest respect for Dr. Newell. I have made it a point, Mr. Weisl, to keep in very close touch with the senior scientists of all of our naval laboratories. I am fully aware of the feeling of Dr. Newell and a good many other of our senior scientists that at times there is too much attempted control by the military as to their fields of research and the extent to which they can get into those things.

I am doing my level best to free up the atmosphere, give our scientists the maximum opportunities to explore the fields they feel they should.

Mr. WEISL. Please—I beg your pardon, I don't want to interrupt you, but what I asked was, do you agree with the conclusion of Dr. Newell that the military is incompetent to direct this research?

Mr. NORTON. No, sir; I don't agree with that altogether.

Mr. WEISL. Well, to what extent do you agree with it?

RELATIONSHIP BETWEEN MILITARY AND SCIENTISTS

Mr. NORTON. Well, there is a very close relationship between what the military needs and what the scientists can do. There has to be a direct feedback between scientists and military. It has to be a two-way street.

Mr. WEISL. Dr. Newell says there should be liaison between research and the military, but he points out that the military should not direct that research.

Mr. NORTON. I think when it comes to basic research, he has made a correct statement. But the point I am trying to make here is that the military, the Air Force, the Army, and the Navy, all three of them, have tremendous needs for, in fact their growth potential is wrapped up in, basic research. There must be a direct contact and feedback between the two.

Mr. WEISL. Again, may I interrupt, if you will permit me.

In backing up his conclusion that the military should not direct research, Dr. Newell is not speaking of basic research. He points to a specific project, and I quote:

The Viking, which was begun in 1946, was developed as an upper-air research vehicle. The rocket itself, the techniques learned and the associated equipment developed form the nucleus for further development into a ballistic-missile system. Nevertheless, Naval Research Laboratory never could obtain the financial support to carry out such development.

In 1952, the Laboratory pointed out to the Navy the importance of ballistic weapons to military preparedness, and showed in detail how the Viking experience and hardware could be used as a basis for the development of a medium-range ballistic missile usable from land, ship or submarine, but such project was never funded. When the ballistic-missile proposal failed to receive support, Naval Research Laboratory decided to use the Viking as a supporting

research vehicle to obtain data important to missiles. Because of its costs, it was difficult for the Naval Research Laboratory to fund this project, and since appeals to both the Navy and the Air Force brought no support, the project was about to go under when the Vanguard program finally came along.

Now, there you have the opinion of one of the important men in your own Naval Research Laboratory, who states that the military should not direct research; that they should have liaison with research, but not direct it. And he gives a specific instance to show how he failed to get support from the military for a project which might well have resulted in a ballistic missile for land, sea, and air use.

Mr. NORTON. Mr. Weisl—

Mr. WEISL. Yes, sir.

Mr. NORTON. I want to make it clear that I agree completely with the example Dr. Newell has given. I think it was exceedingly unfortunate that the Naval Research Laboratory was not funded to the extent that would have produced this development in the time scale that he mentions there.

I certainly wouldn't want to support to this committee, for 1 minute, that the military should preside over our basic research program to the point where they would actually guide or try to guide scientists as to what they are doing.

Mr. WEISL. I don't want to labor the point, but he was not speaking of a basic research program. He was speaking of a specific research program, namely, the Viking.

Mr. NORTON. That is correct. The thing had gotten to a, you might say, development stage. It is a little hard to draw the line between basic and applied research and development, and I deplore the decision that was taken as against the readiness of the Navy, against the funds available, that did not finance the Naval Research Laboratory at that time.

This was a matter of judgment, and I am not trying to say it was good judgment.

BAD JUDGMENT NOT TO FUND VIKING

Mr. WEISL. You would say it was bad judgment, wouldn't you?

Mr. NORTON. Yes, sir, I think one reason why we are all of us in this room is that we are looking, I hope frankly and across the board, without politics or without service rivalry, at a lot of bad judgment.

Mr. WEISL. May I ask you, Mr. Secretary, whether the Naval research and development program has been seriously hampered by budget limitations?

Mr. NORTON. Yes, sir, I would say that it has been.

Mr. WEISL. Will you please tell the committee in what respect it has been?

Mr. NORTON. I would say that the Naval research and development program has, in general, suffered from budget limitations in the same degree, relative degree, that our readiness has suffered.

In other words, I would put it this way: The Navy each year has come up with a figure, just as the Air Force has, and the Army, which they believed was the figure needed to do the job and do it right.

This included readiness, it included research, it included their considered judgment as to how much of your total budget should be devoted to readiness as against research.

During the years that I have served with the military in the Air Force or the Navy, the amount of money that the services wanted has not been forthcoming. I am not claiming that in all cases it should have been forthcoming. The services naturally want a lot of money. They want to do a lot of things.

My role in the job that I am in now is to come up with the best program that we can possibly come up with. If we get less money than we want, then I am faced with, I guess, a choice of two things: Either I quit, turn in my suit and go home, or I stay on the team and do the best I can with what I get.

When the Navy is told that its total dollar figure for the year is so many billion dollars, then the Navy has to sit down around a table, as we do, and divide up that amount of dollars.

Mr. WEISL. Who tells you that the Navy budget is that?

Mr. NORTON. The Secretary of Defense.

Mr. WEISL. And who tells him?

Mr. NORTON. I would assume the President of the United States.

Mr. WEISL. Proceed, Mr. Norton.

Mr. NORTON. Well, we sit down around the table, and we each one of us argues his case, and I scream like a wounded wolf when they take away some of the money that I think should go into the research and development program.

But when the meeting is over, with each one of us having spoken his piece, then it behooves me, as an enthusiast for research and development, to consider the readiness problems that Admiral Burke is faced with.

I am not competent to judge the degree of readiness or unreadiness that our Navy can get along with. If I am told by operating people in the Navy that, "We simply can't get along with less than so much gasoline and maintenance and operation and airplanes and ships and submarines, and so on," I don't dispute that. I accept it.

Now, I am not trying to imply that—

Mr. WEISL. Is it your opinion, Mr. Secretary that research and development should be confused with needs for gasoline and oil?

Mr. NORTON. No; this is just the point I wanted to make, Mr. Weisl. I certainly do not feel that these things should be confused. I think that when you are faced, as we have been faced, with a total dollar straitjacket in which we are going to operate the United States Navy, good judgment requires that we shall tailor each part of the Navy to fit within that straitjacket and do the best job we can, and that is what I have operated on in—

Senator JOHNSON. Would you say the decision to have a dollar straitjacket was bad judgment?

Mr. NORTON. In my opinion, it was bad judgment, yes, sir.

Senator JOHNSON. Thank you, Mr. Secretary.

Mr. NORTON. That is my personal opinion.

Senator JOHNSON. I appreciate your frankness and your honesty and you have been of help to the committee.

Mr. NORTON. May I point out, Mr. Chairman, that in giving that personal opinion, I do not consider myself qualified to gage, as the President has to do, what the status of the United States economy is, what the status of the tax program is, and all the other considerations that enter into making up your mind as to what percentage of the gross product of the Nation goes—

Senator JOHNSON. We are aware of all those explanations. I just wanted your opinion as to whether it was good judgment or bad judgment.

Mr. NORTON. That is my opinion.

Senator JOHNSON. Go ahead, Counsel.

Mr. WEISL. Mr. Secretary, you say that when the budget is determined by the Navy, then a proportion of that budget is allocated by the Navy to research and development. Is that not then further passed upon by the Department of Defense?

Mr. NORTON. It is true that the research and development program that we work up each year is passed on by the Department of Defense.

Mr. WEISL. And does the Department of Defense enlarge or cut that allocation of funds to research and development?

Mr. NORTON. In my experience, the Department of Defense as a whole, that is, the final decision of the Secretary of Defense, has been to cut.

Mr. WEISL. And has that cut seriously hampered your research and development program?

Mr. NORTON. Yes; it has.

Mr. WEISL. Has it resulted in delaying the ultimate manufacture or operation of the weapons that we need for the defense of the United States?

Mr. NORTON. In my opinion, it has.

Mr. WEISL. Has it forced you to cut down your research program both in the basic field and in the supporting or applied field of research?

Mr. NORTON. It has; yes, sir.

Mr. WEISL. Now, even after the allocation requested is cut, do you have to justify quarter by quarter or month by month to the Bureau of the Budget or the Comptroller of the Defense Department the doling out of those funds for research?

Mr. NORTON. We do.

Mr. WEISL. And does not that result in hampering the development of research, both applied and basic?

Mr. NORTON. It does; yes, sir.

Mr. WEISL. Are the people in the Budget Bureau or in the Comptroller's Office research experts or development experts?

Mr. NORTON. They have some experts who are well qualified to express views on the research efforts of the three services.

Mr. WEISL. Let us take the Comptroller of the Department of Defense, Mr. McNeil. What experts has he got on research and development to pass upon funds that have been approved by the Department of Defense, allocated by the Navy and appropriated by the Congress?

Mr. NORTON. I would say my answer is "None."

Mr. WEISL. None. Are there any bottlenecks in research and development other than those that I have asked you about, Mr. Secretary, that you would like to tell the committee about?

Mr. NORTON. No, Mr. Weisl. I think you have pretty well covered the areas where we feel at our level that the research effort has been held at a rate lower than we would like to have seen it.

Mr. WEISL. Are there any other statements that you would like to make concerning material that is not covered either by your prepared statement or in answer to the questions that I asked?

Mr. NORTON. No, Mr. Weisl, I do not think of any at the moment.

Mr. WEISL. Would you tell us briefly about the Vanguard program and the Navy's relations to it?

Mr. NORTON. I will have to put myself in the time period here. I came aboard as Assistant Secretary of the Navy for Air in June of 1956. The Vanguard program had already been determined. The Navy had been chosen as the agent. The nature of the program had been fixed. I do not know whether you would like me to go into that past history or whether the committee is—

Mr. WEISL. I do not want to go into the history, but I think the committee would be interested in knowing what you know of your own knowledge of this program. First, the publicity attending the program. Did the Navy put out this publicity?

Mr. NORTON. No, sir.

Mr. WEISL. Who put out this publicity?

Mr. NORTON. The publicity connected with the Vanguard program was a matter of policies determined at a higher level than the Navy.

Mr. WEISL. Where?

Mr. NORTON. I am not sure where it was determined, Mr. Weisl.

Mr. WEISL. Who is sure?

Mr. NORTON. I did not hear that question.

Mr. WEISL. Who is sure? Who can we get to tell us where this publicity emanated from? Who issued the releases on it?

Mr. NORTON. I can recite to you my association with this publicity and my firsthand knowledge of the problem. There are two gentlemen here—Admiral Hayward and Admiral Bennett—who I think perhaps could give you further detail, if you wish to go into it, from their firsthand knowledge.

Mr. WEISL. But you know that the Navy did not issue the publicity; is that right?

Mr. NORTON. I know that the Navy was not responsible for the policies on which the information was issued.

Mr. WEISL. And you do not know who issued the information? Was it the Department of Defense?

Mr. NORTON. Oh, the source of the information was the United States Navy, there is no doubt about that. We are doing the job, and the information came from the people on the job who are doing it.

Mr. WEISL. I know the source of the information may have been the United States Navy, but who issued it to the press and to the public? Who was responsible? What public relations man, if any, was responsible for issuing publicity in statements connected with the Vanguard test?

Mr. NORTON. The Secretary of Defense has an Assistant Secretary for Public Affairs.

Mr. WEISL. Who is that?

Mr. NORTON. Right now it is Mr. Murray Snyder.

Mr. WEISL. Did he issue the publicity statements, to your knowledge?

Mr. NORTON. Mr. Snyder's office, I think, told us the policy that was to be adopted.

Mr. WEISL. And what was the policy that he told you was to be adopted?

Mr. NORTON. Well, we had to learn it from actual experience.

Mr. WEISL. I am talking about publicity.

Mr. NORTON. Yes, that is right.

Mr. WEISL. What did he tell you? What did that office or the person in that office tell you?

NAVY WANTED TO CONDUCT TEST "IN PRIVATE"

Mr. NORTON. We were told, in effect, that we must be completely responsive to the questions of the press, that we could not conduct this program as we wanted to do it, in private. Now, we never took the position——

Mr. WEISL. Did you take the position that you wanted to do the project in private?

Mr. NORTON. Yes, sir; we did.

Mr. WEISL. And you were overruled by the Assistant Secretary in charge of publicity? What is the title of Mr. Murray Snyder?

Mr. NORTON. Assistant Secretary of Defense for Public Affairs.

Mr. WEISL. And he overruled your desire to do the test in private?

Mr. NORTON. Yes, sir.

Mr. WEISL. Have you the publicity releases that were issued?

Mr. NORTON. Not with me; no.

Mr. WEISL. Has the Navy got them?

Mr. NORTON. Yes; I am sure we have.

Mr. WEISL. Would you please supply them to the committee?

Mr. NORTON. We will be glad to do it; yes, sir.

(The referenced press releases are as follows:)

DEPARTMENT OF DEFENSE,
OFFICE OF PUBLIC INFORMATION,
Washington, D. C., December 2, 1957.

No. 1158-57

For the Press:

Information and pictures of the upcoming first test flight of the three-stage Vanguard rocket will be released according to the following plan:

Announcement that the rocket has been launched will be made immediately by the Department of Defense in Washington and at Patrick Air Force Base, Florida. If the launching occurs during a period when reporters are not at the Pentagon pressroom, simultaneous telephone notification will be made to the three wire services in Washington by the Office of Public Information.

Results of the test, such as announcement of whether or not the test sphere has entered into an orbit, will be made in Washington at the Vanguard Control Center, Naval Research Laboratory, as soon as the necessary data is received and evaluated. This may take as long as 2 hours after the launching. Dr. John Hagen will be available at the lab at this time.

Official still pictures of the launching will be released at Patrick Air Force Base, Florida, as quickly as they can be processed. Additional stills and motion picture footage will be flown to Washington for release as soon as processed.

A current fact sheet on Project Vanguard is available today.

The Vanguard Control Center is on the second floor of the building right at the main gate of NRL. Telephone is JO 3-6600, Ext. 2541.

Dr. Richard W. Porter, Chairman of the Technical Panel on the Scientific Earth Satellite, of the U. S. Committee for the IGY, may also be present at the Vanguard Control Center.

DEPARTMENT OF DEFENSE,
OFFICE OF PUBLIC INFORMATION,
Washington, D. C., December 2, 1957.

No. 1157-57

FACT SHEET: SCIENTIFIC EARTH SATELLITE PROGRAM

(Within a few days the Navy expects to launch the fourth in its VANGUARD test series at Cape Canaveral, Florida. Following is up-dated background on the VANGUARD project for use in conjunction with official test coverage.)

On July 29, 1955, the White House announced that the United States planned to launch small, unmanned earth-circling satellites as part of United States participation in the International Geophysical Year (July 1, 1957, to December 31, 1958). The program was undertaken at the request of the U. S. National Committee for the IGY, established by the National Academy of Sciences, which is sponsoring U. S. participation in the IGY with support of the National Science Foundation. Project Vanguard is the name assigned to the Department of Defense part of the satellite program, under management of the Chief of Naval Research. Responsibility for the technical aspects of the program rests with the U. S. Naval Research Laboratory, Washington, D. C.

Elements of the project for which the Naval Research Laboratory is responsible are:

- A. The launching vehicles.
- B. Electronic instrumentation of the vehicles.
- C. Design and construction of the satellites.
- D. Major portions of the scientific instrumentation of the satellites, as well as installation of the instrumentation.
- E. Launching the vehicles and the satellites.
- F. Radio tracking of the satellites, computing their orbits, and receiving from them telemetered data.

The Martin Company, Baltimore, Maryland, is prime contractor for the three-stage launching vehicle.

In cooperation with the Naval Research Laboratory, the Army Corps of Engineers is establishing and manning six of the ten radio tracking stations. Air Force, civilian and Navy technicians will operate others.

The Air Force, at its Missile Test Center at Cape Canaveral, Florida, is providing necessary testing and launching facilities.

TV-3

Officially, the next test vehicle fired will be called Test Vehicle Three, or TV-3. Test Vehicle Zero, or TV-0, was fired on 3 December 1956. It was a single-stage test, using a Martin Viking rocket. TV-1, on 1 May 1957, was a two-step rocket, using a Viking as the first stage and a prototype of the Vanguard's third stage. TV-2 on 23 October 1957 consisted of a prototype of the first stage of the final launching vehicle and second and third stages which were "dummies" except for some test instrumentation. This rocket was the first to have the external configuration of the final three-stage satellite launching vehicle. All three previous test firings were regarded as highly successful by the scientists and engineers from the Naval Research Laboratory and The Martin Company.

PURPOSE OF TV-3

TV-3 is the first of a series of three three-stage test rockets now planned for the Vanguard test program. It will also carry a test "payload" consisting of an aluminum sphere weighing about $3\frac{1}{4}$ pounds and measuring 6.4 inches in diameter. Six radio antennas will project from this sphere for radiating the output of two separate radio transmitters. One of these transmitters will use mercury batteries which will enable the transmitter to provide ten milliwatts of continuous radio frequency output for approximately two weeks. The other transmitter will be powered by six solar cells mounted on the exterior surface of the sphere. These cells, developed by the U. S. Army Signal Engineering Laboratories at Fort Monmouth, New Jersey, should have sufficient capacity to enable the transmitter to radiate at least five milliwatts. Both transmitters will be temperature sensitive, the frequency shift being about 100 cycles per

degree Centigrade. The transmitter which is powered by the chemical batteries will be located in an inner package, transmitting on a frequency of 108.00 megacycles, and the other will be mounted on the skin, and transmit on a frequency of 108.03 megacycles. If both transmitters operate properly, it should be possible to determine the temperature variations of the shell to within an accuracy of approximately five degrees Centigrade, by measuring the difference in frequency. Such information may be valuable in verifying calculations of the shell temperatures for the IGY satellites.

If this first three-stage test should meet with unusual success in all its complexities, there is a possibility that an orbit could be attained by the test sphere. This is not the prime purpose of the test, but of course such a result would be welcome because of the additional data which could be gathered.

The test sphere will be too small to be seen with the naked eye, or even with binoculars except under the most favorable circumstances. It is therefore essential for at least one of the radio transmitters to operate satisfactorily in order that radio position information may be obtained.

THE VANGUARD LAUNCHING VEHICLE

The composite, three-stage, satellite launching vehicle is approximately 72 feet long. Shaped like a rifle shell, it is 45 inches in diameter at its base. It is finless, of integral tank construction, and has a gross take-off weight (with propellants) of 22,600 pounds, or approximately 1,000 pounds of rocket and propellants for each pound of the 21½-pound satellite.

FIRST STAGE

The liquid propellant first stage will be expected to lift the entire three-stage vehicle to a point about 36 miles above the earth at a peak velocity of 3,700 miles per hour. It probably will exhaust its fuel supply of liquid oxygen and kerosene in about 2 minutes 22 seconds, then drop into the Atlantic about 230 miles from Cape Canaveral. Its gimballed engine, delivering 27,000 pounds of thrust, is built at the Cincinnati, Ohio, plant of General Electric Company. In essence, the first stage is a guided booster which provides about 65 percent of the energy to raise the remaining stages to orbital altitude and about 15 percent of the required orbital (horizontal) velocity.

SECOND STAGE

This is also a liquid-propellant rocket. Propellents are white fuming nitric acid and unsymmetrical dimethylhydrazine fed directly to the motor from high pressure tanks under helium gas pressure. The engine and related tankage are made by Aerojet-General Corporation, Azusa, California. The engine provides 7,500 pounds of thrust at operating altitudes. The second stage contains the "brains" for the entire launching vehicle—the complete guidance and control system which will be used during three periods of flight: First-stage powered flight, second-stage powered flight, and second-stage coasting flight. The Minneapolis-Honeywell Regulator Company, Minneapolis, Minnesota; Air Associates, Teterboro, New Jersey; Designers for Industry, Cleveland, Ohio, and the Martin Company provide the guidance and control system.

The second stage houses within its nose, which is also the nose of the composite vehicle, the third-stage rocket and the satellite. The nose cone protects the delicate satellite sphere from aerodynamic heating during the first stage and part of the second-stage ascent. The mechanism for "spinning" the third stage is contained also in the second stage.

THIRD STAGE

The third stage is a solid propellant rocket that delivers about 2,300 pounds of thrust at operating altitude. Two companies have been given development contracts for third-stage engines. Grand Central Rocket Company, Redlands, California, had an engine successfully flight tested in TV-1. Allegany Ballistics Laboratory, Cumberland, Maryland, is developing its version. The third stage consists of a cylindrical case, a nozzle, propellant charge, and igniter. It has no steering controls. Therefore, stable flight is achieved by spinning the rocket about its longitudinal axis. The third stage is spun while it is in the second stage, then separates and ignites. This last stage is fired at the orbital height of about 300 miles and provides about 50 percent of the required orbital velocity of

about 18,000 miles per hour. The satellite is attached to the forward end of the third stage and is separated after orbital velocity is reached. The separation is attained by means of a spring mechanism actuated by a mechanical timer.

THE SATELLITES

United States plans currently call for six fully instrumented satellite launching attempts during 1958. The first in this series will measure 20 inches in diameter and weigh approximately $21\frac{1}{2}$ pounds. The skin will be made of a magnesium alloy, coated with gold, chromium, a layer of silicon monoxide, aluminum, and another coating of silicon monoxide. These coatings are designed to provide optimum reflectivity and absorption in the visible and infra-red portions of the electromagnetic spectrum. Instrumentation in this satellite will be housed in an internal cylinder and weigh approximately $10\frac{3}{4}$ pounds, some 8 pounds of which will be chemical batteries. Instrumentation in the internal "package" or on the shell of the satellite will include two ionization chambers, a solar aspect cell, erosion gauges, a cadmium sulfide cell for erosion studies, micrometeor microphones, thermistors, a Minitrack radio transmitter, a telemetry system, and ultraviolet radiation (Lyman alpha) memory storage units. Subsequent planned experiments call for measurements of geographical, temporal, and altitudinal variations of primary cosmic ray intensity; total magnetic field at altitudes above the more densely ionized regions of the upper atmosphere; and either the geographical distribution of the energy received by and radiated from the earth, or, alternatively, a study of the changing patterns of the cloud cover of the earth.

SATELLITE LAUNCHING

Since the satellite will be launched from the Air Force Missile Test Center near Cocoa, Florida, the inclination of its orbit to the equator will be at least the latitude of Cocoa, or $28^{\circ} 28'$. Actually, the inclination is expected to be somewhat greater than this, or about 35° . The inclination will permit the satellite to be observable in the temperate latitudes where density of scientific population and equipment is high.

SATELLITE ORBIT

Once the satellite is separated from the third stage it will become a separate entity and exist in space with an orbit of its own, freed of the rotation of the earth about its axis. The orbit will be, however, a part of the earth system in its revolution around the sun. The satellite is expected to orbit around the earth about every 100 minutes. As the earth rotates on its axis, the satellite orbit will be displaced overhead some twenty-odd degrees to the west during each revolution. In this way, in time, it will cover a latitude band equal to twice the inclination of the orbit and evenly spaced about the Equator.

The chosen orbit is a nominal circle 300 miles above the surface of the earth. If the angle and velocity of firing could be perfectly controlled, the orbit could indeed be circular, but errors in height, angle, and velocity will no doubt result in an elliptical orbit. In the elliptical orbit it is intended that the nearest approach to the earth be not less than 200 miles and the furthest extension not greater than 1,500. While the atmosphere at 200 miles is extremely tenuous, drag will be sufficient to take energy out of the orbit and cause the satellite eventually to fall to earth. Based on present estimates of densities, it is calculated that the satellite could exist in a circular orbit of 300 miles' height for about one year. If the height were 200 miles the lifetime would be only 15 days, and were it 100 miles the lifetime would be less than one hour.

RADIO TRACKING

In the establishment of a satellite in an orbit about the earth, the problems of acquiring it initially by ground instrumentation, and then tracking it with sufficient precision to determine its orbit assume major proportions.

Once a satellite is launched, it will be exceedingly difficult to detect its passage overhead by optical means. Since it is only 20 inches in diameter and will be an average distance of 300 miles at closest approach, its brightness will be about that of a 5th magnitude star, the faintest star seen by the naked eye on a dark clear night, far from city lights. The brightness of the daytime sky and the fact that the satellite will be eclipsed when it is on the dark side of the earth make it possible to see it only just before sunrise and just after sunset.

Accordingly, a system of radio angle tracking, known as Minitrack, and developed at the U. S. Naval Research Laboratory, will be used to prove that the satellite is orbiting and to predict its arrival over observation points around the world.

The pattern of the Minitrack antennas will be fan shaped, with the axis of the beam pointed to the zenith, and the plane of the fan along the north-south plane. At satellite heights, the beam will be several hundred miles wide. In this way a chain of stations distributed roughly up and down North and South America can intercept the satellite at each passage. Such a chain has been established:

Blossom Point, Maryland (approximately 38.4° N. Lat.)
Fort Stewart, Georgia (approximately 32° N. Lat.)
Batista Field, Havana, Cuba (approximately 22.9° N. Lat.)
Mount Cotopaxi, Quito, Ecuador (approximately 0.6° S. Lat.)
Ancon, Lima, Peru (approximately 11.8° S. Lat.)
Antofagasta, Chile (approximately 23.5° S. Lat.)
Poldehue Military Reservation, Santiago, Chile (approximately 33.5° S. Lat.)

To augment data from the North-South Chain, there are Minitrack stations at Coolidge Field, Antigua, B. W. I. (approximately 17.1° N. Lat.); the Naval Electronics Laboratory, San Diego, California (approximately 32.6° N. Lat.); at Woomeera, Australia (approximately 31.6° S. Lat.) and at Olifantsfontein, Union of South Africa (approximately 25° S. Lat.)

Data from the Minitrack ground stations will be received by teletype at the Vanguard Control Center at the Naval Research Laboratory and relayed to the Vanguard Computing Center, for introduction into an electronic computer. Calculated schedules will also be furnished from the Control Center to optical tracking stations around the world.

OPTICAL TRACKING

An important part of the measurements will be the determination of satellite position with respect to time at different parts of the earth. Depending upon the reflectivity, the satellite will have a brightness of the order of a fifth or sixth magnitude star. If its location is known exactly for a particular time under very clear atmospheric conditions, it might be observable with a good pair of binoculars and it should be readily observable with a modest astronomical telescope. Best periods for optical observation will be about an hour after sunset and about an hour before sunrise. IGY officials are planning 12 prime astronomical observatory stations in different parts of the world with some 200 secondary stations. The optical tracking programs are directed by the Smithsonian Astrophysical Observatory, Cambridge, Massachusetts.

COMPUTING CENTER

An IBM 704, most advanced of the high-speed electronic computers manufactured by International Business Machines Corporation, using the data obtained from the Minitrack Stations, will calculate and predict the orbit of the satellite. The IBM 704 is installed in the Computing Center, Washington, D. C. and was utilized for computing the orbits of the Soviet satellites. As the satellite is carried into space, the computer will begin 24-hour-a-day operation to predict its course.

Designed primarily for engineering and scientific work, the machine computes data at phenomenal speeds. From a minimum of one position report per 100-minute revolution of the satellite, the 704 will calculate the satellite's imminent passage overhead for the benefit of official and unofficial observers around the world. These detailed predictions will be given, among others, to Minitrack radio tracking stations, IGY optical stations, and principal astronomical observatories.

COST

It is estimated that the cost of the U. S. scientific earth satellite program may run as high as \$110 million. Of this amount, approximately \$18 million is being provided by the National Science Foundation. The remaining cost of approximately \$92 million is being met by the Department of Defense.

Mr. WEISL. Was the Navy required to approve them before they were issued?

Mr. NORTON. I think that the issuance of these statements changed as time went on, Mr. Weisl. I think it began with the office of Mr. Snyder handling all issues. At a later time Mr. Snyder sent a representative down to Cape Canaveral and statements were issued directly from Cape Canaveral.

Mr. WEISL. You will supply the committee, Mr. Secretary, with all the releases?

Mr. NORTON. I would be glad to.

Mr. WEISL. Publicity releases?

Mr. NORTON. Yes, sir.

Mr. WEISL. Thank you. Were you surprised that the Vanguard program failed in the particular test that was publicized?

Mr. NORTON. I was not at all surprised at the failure of that particular test; no, sir.

Mr. WEISL. Did you expect that there was a reasonable chance that it would fail?

Mr. NORTON. I thought it was quite likely that it would fail. We had had three previous successes.

Mr. WEISL. Did you suggest to the publicity department that the public ought to be advised that this was merely a test and that it might fail or was likely to fail, so that they would not be——

Mr. NORTON. Yes, sir.

Mr. WEISL. You did suggest that?

Mr. NORTON. I had many conversations. First of all with Mr. Gates. I had them with Mr. Snyder. I had them with Mr. Ross, who preceded Mr. Snyder on the job.

Incidentally, I was not particularly discussing the satellite program. I have believed very strongly that the entire missile program, and especially the testing of these missiles, should be done in privacy and not in public.

Mr. WEISL. And what did you tell Mr. Snyder about the need for keeping this private and keeping publicity down?

Mr. NORTON. I told him that I thought it was against the safety of our country to do it in public. I did not think it was in the public interest to do it.*

Mr. WEISL. You still think so; do you not?

Mr. NORTON. I still feel that way very strongly; yes, sir.

Mr. WEISL. Thank you, Mr. Secretary. Now, you spoke about the necessity of having scientists of our allied countries associate with us in the research and development programs that we so badly need. What obstacles are there to the use of these scientists today, Mr. Secretary?

Mr. NORTON. Well, there are two obstacles, I guess. You might say there is a statutory obstacle, which is mostly related, of course, to the exchange of nuclear information, atomic information. And then there is the regulatory side of the business which has to do with the disclosure policy of the Department of Defense.

*As a result of reviewing this testimony, Mr. Norton has asked that this footnote be inserted for the purpose of indicating that his answer at the point where the asterisk appears above was intended by him to refer to prior discussions which related to the entire missile program rather than merely to the projected Vanguard launching. Mr. Norton states that he did not intend to imply that he had, prior to December 6, 1957, expressed to Mr. Snyder personally his own feelings about advance publicity in connection with the Vanguard launching.

Now, fortunately, I think about 90 percent of the problem seems to be centered on the regulatory side rather than on the statutory side, so that it has been possible to take action—I have done this jointly with my two opposite numbers in the Air Force and the Army—Secretary Horner and Dr. Martin. It has been possible to find out where the bottlenecks occurred in the exchange of basic information and to do something about it.

It has been a rather slow job, but I think all three of us could tell you—I certainly could from my experience—that the regulatory side of the thing, it has been consistently easier to get these bottlenecks opened up.

Mr. WEISL. I am speaking now of the use of foreign scientists, whom you so very properly said should be used in this effort, and you pointed to the success of the Manhattan project where we used men like Dr. Fermi, Dr. Bohr, Dr. Teller, Dr. Einstein—all of foreign birth, although some had become American citizens.

Now, I ask you why we cannot do that with the research and development into the missile program? You pointed out certain regulations. What are those regulations?

Mr. NORTON. Sir, there is a joint committee called the State-Defense Military Information Control Committee. This Committee, just as the name implies, sets the policy, and in considerable detail prescribes the information that can be exchanged.

The areas that have bothered me most, that have troubled me most, are the areas of basic research, especially in countries where their basic research is actually ahead of ours. Take, for example, a country that has gone further in certain aspects of basic research in electronics or in infrared.

I am not a scientist, Mr. Weisl, but when I find that our scientists in those fields are agreed that those countries are really ahead of us—now, these are friendly countries, these are NATO countries—are really ahead of us in this field, then I ask whose purpose do we serve when we limit the exchange of information between our scientists and their scientists. It is entirely possible that the Department of Defense may not be wholly happy about the security controls and systems of that particular country, but is it not true that even if these people were a bunch of Russians, if they are ahead of us, why should our scientists not communicate with them.

I am talking basic research, fundamental knowledge.

Mr. WEISL. I am asking you why should we not?

Mr. NORTON. This is a question I have repeatedly asked.

Mr. WEISL. What stops—for instance, you say some countries, and I assume you are referring to France——

Mr. NORTON. I am referring to friendly countries.

Mr. WEISL. A friendly country such as France—they have scientists ahead of us in electronics—is that what you were referring to?

Mr. NORTON. They do; yes, sir.

Mr. WEISL. Now, why can we not confer with those scientists?

Mr. NORTON. I do not know.

Mr. WEISL. Why can we not use the services of those scientists to the mutual advantage of France and the United States?

Mr. NORTON. This is something that I think we should look into. I think we should look into it on the statutory side as well as on the regulatory side.

Mr. WEISL. What statute is there against it?

Mr. NORTON. You have the atomic-energy statute which, in my opinion, could well be looked into now, in the light of what we are up against today.

Mr. WEISL. I am asking for your opinion, Mr. Secretary. Your opinion is that we should?

Mr. NORTON. Yes, sir.

Mr. SALTONSTALL. Mr. Chairman, would the counsel permit an interjection on that point?

Mr. WEISL. Certainly, Senator Saltonstall.

Senator SALTONSTALL. Thank you.

Mr. Norton, do you know of the research and coordination efforts of Colonel Gossick's organization in France and Belgium?

Mr. NORTON. Yes, sir.

Senator SALTONSTALL. I do not want to take away from the counsel at the present time, but I think if the counsel would be willing to elaborate on Colonel Gossick's activities, it might be very helpful.

Mr. WEISL. Are you familiar with Colonel Gossick's activity in this field?

Mr. NORTON. No, sir; I am not. I know of it in general but I am not familiar with it.

Mr. WEISL. But you do endorse the same recommendation that Dr. Teller, General Doolittle, Dr. Bush and other witnesses made to this committee that there be a freer exchange of information between our scientists and the scientists of our allies and even the scientists of neutral countries?

Mr. NORTON. Yes, sir.

Mr. WEISL. So that we could accelerate and develop—

Mr. NORTON. Yes, sir.

Mr. WEISL. The necessary weapons at the earliest possible time?

Mr. NORTON. I do. I have discussed this with everyone of the gentlemen you mentioned many times, except Dr. Bush.

Mr. WEISL. I know that you have done great work in that field. I know that of my own knowledge, Mr. Secretary. Now, is there anything that I have omitted to ask you that you think the committee ought to know?

Mr. NORTON. No, sir. I would like—I am not sure from the testimony so far whether I have left the clearest possible representation with you as to the handling of the Vanguard publicity story. Both Admiral Hayward and Admiral Bennett, who are here with me, are more familiar with the details. It so happens that I was out of the country and in the Far East during a rather crucial period here in all this. If you feel that you would like to get into that a little further, I would prefer to ask them to assist me in the details.

Mr. WEISL. If we can do it in as brief a time as possible, the chairman would appreciate Admiral Bennett and Admiral Hayward assisting you in the details of why this publicity was released.

Mr. NORTON. I do not know whether you would wish to swear these gentlemen in or not.

Senator JOHNSON. Admiral Bennet, will you raise your right hand, please.

Do you solemnly swear the testimony that you give this committee will be the truth and the whole truth?

Admiral BENNETT. I do.

Senator JOHNSON. Do you swear that the testimony you give this committee will be the truth and the whole truth?

Admiral HAYWARD. I do.

(The biographies of Admirals Bennett and Hayward are as follows.)

REAR ADM. RAWSON BENNETT II, UNITED STATES NAVY

Rawson Bennett II was born on June 16, 1905, in Chicago, Ill. He was appointed to the United States Naval Academy, Annapolis, Md., from California in 1923. Graduated and commissioned ensign on June 2, 1927; he subsequently advanced to the rank of captain, to date from March 20, 1945. In December 1955 he was appointed rear admiral, to date from January 3, 1956.

Following graduation in 1927, he joined the U. S. S. *California*, flagship of the battle fleet. Later, in 1928, he was assigned communication duty on the staff of commander, battle fleet, serving as such until August 1930. In November of that year he reported on board the U. S. S. *Isabel*, for duty on Asiatic station, and in October 1932 was transferred to the U. S. S. *Rochester*.

He completed his Asiatic tour of duty in the U. S. S. *Houston* in 1933. Detached from this vessel, he returned to the United States and joined the U. S. S. *Idaho*.

Relieved of duty on the *Idaho* in June 1934, he returned to Annapolis, Md., for postgraduate instruction in radio (electronic) engineering. He completed the course in May 1936, and was assigned to the University of California, Berkeley, for additional postgraduate work, receiving the master of science degree in electrical engineering, after which he reported aboard the U. S. S. *Concord*. Continuing sea duty, he joined the staff of the commander, Destroyer Division 19 (later redesignated Destroyer Division 50) in April 1938, and served as radio and sound officer until June 1941.

Starting in July 1939, he set up the technical program of the first Fleet Sound School at San Diego, Calif.

In July 1941 he reported to the Bureau of Ships, Navy Department, Washington, D. C. There he served first as head of the Underwater Sound Design Section of the Radio Division, and later head of Electronics Design Division, from 1943 to 1946. He was awarded the Legion of Merit "for exceptionally meritorious conduct" during his tour of duty in the Bureau of Ships. The citation further states:

"* * * Proposing and organizing the first antisubmarine attack teacher, which was subsequently utilized in training antisubmarine personnel, (he) also designed sonic and supersonic underwater sound apparatus so urgently required by the fleet for the destruction of Axis submarines and Japanese shipping * * *"

Detached from the Bureau of Ships in August 1946, he reported as Director of the United States Navy Electronics Laboratory, Point Loma, San Diego, Calif., where he accomplished the postwar expansion of that laboratory. In July 1950 he was ordered to Washington, where he set up and became the first Director of the Electronics Production Resources Agency of the Departments of the Army, Navy, and Air Force.

In October 1951 he reported to the Bureau of Ships, Navy Department, where he was assigned duty as head of the Mine Warfare Branch. Under orders of March 20, 1953, he next served as naval inspector of machinery and naval inspector of ordnance, General Electric Co., Schenectady, N. Y. In February 1954 he reported to the Bureau of Ships for duty as Assistant Chief of the Bureau for Electronics.

In December 1955 he was appointed Chief of Naval Research, with the rank of rear admiral, taking office on January 3, 1956.

He is a fellow of the Institute of Radio Engineers, a fellow of the Acoustical Society, and a fellow of the American Association for the Advancement of Science. He is a registered professional engineer, State of California.

In addition to the Legion of Merit, Rear Admiral Bennett has the Yangtze Service Medal; the American Defense Service Medal, Fleet Clasp; American Campaign Medal; World War II Victory Medal; and the National Defense Service Medal.

REAR ADM. JOHN T. HAYWARD, UNITED STATES NAVY

Admiral Hayward is Assistant Chief of Naval Operations (Research and Development).

He was born in New York City on November 16, 1908. He graduated from the United States Naval Academy in 1930.

His early service included sea duty on the *U. S. S. Richmond*. He was designated naval aviator on September 13, 1932, and subsequently served in carrier-based Scouting Squadron 1; Patrol Squadron 2, based on Coco Solo, C. Z.; the aviation unit of the cruiser *Philadelphia*; and as senior aviator of the cruiser *Phoenix*.

Prior to and following the outbreak of World War II he served as assistant chief engineer (for instruments) at the naval aircraft factory, Philadelphia, and while so assigned had duty in 1940-41 as United States naval observer with the Royal Air Force. From December 1942 until March 1943 he had command of Headquarters Squadron, Fleet Air Wing 2, on the west coast. He commissioned, then commanded, Bombing Squadron 106 in 1943-44.

In June 1944 he became experimental officer at the naval ordnance test station, Inyokern, Calif., where he worked on all phases of rocket development and the development of, and study of destruction caused by, the atom bomb. From July to December 1948 he was Director of Plans and Operations for the Armed Forces, Sandia Base, Albuquerque, N. Mex., concerned with the use of atomic weapons and integration of military requirements with the Los Alamos Scientific Laboratory.

He was in command of Composite Squadron 5 from December 1948 until June 1951. This was followed by a tour of duty with the Atomic Energy Commission (Military Application Division); a year at sea in command of the carrier escort vessel *Point Cruz*; and command of the Naval Ordnance Laboratory from June 1954 to January 1956. He commanded the giant aircraft carrier *U. S. S. Franklin D. Roosevelt* from February 1956 until January 1957, when he became special assistant to the Director, Strategic Plans Division, Office of the Chief of Naval Operations. In July 1957 he was ordered to assume the duties of Assistant Chief of Naval Operations (Research and Development).

Admiral Hayward has received many decorations including the Silver Star Medal, Legion of Merit, Distinguished Flying Cross, and the Purple Heart.

TESTIMONY OF REAR ADM. RAWSON BENNETT, DIRECTOR OF NAVAL RESEARCH; AND REAR ADM. JOHN T. HAYWARD, ASSISTANT CHIEF OF NAVAL OPERATIONS FOR RESEARCH AND DEVELOPMENT

Mr. NORTON. Mr. Chairman, just for the record, I would like to state that Adm. Rawson Bennett is the Director of Naval Research. And Adm. John T. Hayward on my left is the Assistant Chief of Naval Operations for Research and Development.

Senator JOHNSON. Thank you very much, Mr. Secretary.

Counsel, proceed.

Mr. WEISL. Admiral Bennett, you heard the testimony of Secretary Norton, in which he said that he believed it was a great disservice to the United States to put out publicity concerning the Vanguard testing program. He pointed out that it was merely a test, that in his opinion there was a good chance of it failing, that the success or failure of it could not be determined by this test, and if any publicity was put out, it should have been put out with a forceful statement that this was a test that might fail, instead of our putting out publicity that this was the great test that was going to put a satellite or an object in orbit.

Do you agree with the testimony of Secretary Norton?

Admiral BENNETT. I certainly agree in the basic facts as you have stated them, Mr. Weisl.

Mr. WEISL. Have you anything to add to them?

Admiral BENNETT. It might be of interest to the committee that my objection to this excessive publicity was as long ago as January 1957, at which time, when interviewed by the press in the city of New York, I stated that, as far as I was concerned, there would be no publicity attendant on these firings. For this opinion, I was castigated by the press.

Mr. WEISL. Who was this man who authorized and directed this publicity? Was it the Assistant Secretary of Defense, Mr. Snyder?

Admiral BENNETT. As far as I am informed, sir, it was the Assistant Secretary of Defense, Mr. Snyder.

Mr. WEISL. And you cannot blame the newspapers for printing what the Assistant Secretary of Defense in public relations or publicity gives out to them, can you?

Admiral BENNETT. No, sir; we cannot.

Mr. WEISL. You cannot say it was the newspapers' fault if they print what they are handed?

Admiral BENNETT. No, Sir.

Mr. WEISL. Did Mr. Snyder make his own decision?

Admiral BENNETT. I am sure I do not know, sir. I think there are two other points that might be of interest to the committee.

Mr. WEISL. Tell us the two other points.

Admiral BENNETT. The Russians have publicly stated, in the form of the leader of their satellite project, that they had no intention of making advance statements as to any satellite attempts. This was called to the attention of Mr. Snyder by the Secretary of the Navy.

Mr. WEISL. I could not understand, and neither could the chairman, Admiral Bennett, just what you said about what the Russians said and what was called to the attention of the Secretary of the Navy.

Admiral BENNETT. The Russians issued a public statement in Moscow to the effect there would be no announcement of further satellite launchings. This was called to the attention of the Secretary of the Navy, and he, in turn, directed the attention of Mr. Snyder to this premise, stating that it was not, in his opinion, in the public interest to have this excessive publicity.

Mr. WEISL. And, apparently, Mr. Snyder did not pay any attention to the Secretary of the Navy.

Admiral BENNETT. That is my opinion, sir.¹

Mr. WEISL. So that this coordination that exists between the Department of Defense and the Army and the Navy and the Air Force and the Marine Corps does not always exist, does it?

Admiral BENNETT. Respecting public information, in my opinion, it does not, sir.

Mr. WEISL. Thank you very much, Admiral Bennett.

Admiral Hayward, have you anything to add?

¹ Admiral Bennett, on reviewing the above testimony, has stated that he was mistaken in his belief that Assistant Secretary of Defense had received any communication on this subject from the Secretary of the Navy prior to the attempted Vanguard firing on December 6, 1957, and he, therefore, expressed regret that his testimony may have led to an incorrect conclusion that Assistant Secretary of Defense Snyder had overruled the Secretary of the Navy.

- Admiral HAYWARD. Nothing on the Vanguard, Mr. Chairman, but I certainly would like to answer Dr. Newell's letter. His statement as to the Viking not being accepted as a ballistic missile; he is as much out of his field as I would be on the basic-research side. He was proposing a weapons system and, in my estimation, it was good judgment the Viking was turned down as a ballistic-missile weapons system.

Mr. WEISL. You do not object to Dr. Newell expressing an opinion?

Admiral HAYWARD. No, sir; I don't.

Mr. WEISL. How long has he been with the Naval Research Laboratory?

Admiral HAYWARD. He is a very competent scientist, and he is a very competent man.

Mr. WEISL. What you are saying to the committee is that you do not agree with his opinion?

Admiral HAYWARD. I do not.

Mr. WEISL. But you don't object to his stating it to the committee?

Admiral HAYWARD. I do not.

Mr. WEISL. Thank you, Admiral Hayward.

Senator JOHNSON. Senator Bridges?

Senator BRIDGES. Is it your opinion, Admiral, that the decision to develop a weapon and the overall use of that weapon should be a military decision?

Admiral HAYWARD. Yes, sir.

Senator BRIDGES. The research and development may be a scientific decision, but the ultimate decision as to its usefulness as a military weapon is, and should be, a military decision.

Admiral HAYWARD. That is correct.

Senator BRIDGES. And that is the point you wish to make, as far as the Newell letter is concerned?

Admiral HAYWARD. Yes, sir.

Senator BRIDGES. Mr. Secretary, in your statements you indicate that you have not received the money you need for research. Has Congress denied you any money for research?

CONGRESS HAS GRANTED RESEARCH AND DEVELOPMENT REQUESTS

Mr. NORTON. No, Senator Bridges; Congress has given us everything we asked for of the Congress.

Senator BRIDGES. Then, when you presented your program to Congress, the Congress has responded completely, as far as research is concerned?

Mr. NORTON. Yes, sir; that is correct.

Senator BRIDGES. What you object to is the overall decision which put a top limit on naval funds, which included funds for naval research?

Mr. NORTON. Senator, I was saying that, in my personal opinion, it was a mistake to put that ceiling on the defense effort; yes, sir.

Senator BRIDGES. Of course, Mr. Secretary, as you know, someone has to make an overall decision as to the amount of money that is included in the budget for various purposes. The recommendations must come from someone, and the activity having top priority is, of course, the security of the United States.

However, the security of the United States might also be jeopardized by our economy. Therefore, someone has to make this overall decision. You are not objecting to the fact that the overall decision was made, but you think it was placed too low; isn't that the point?

Mr. NORTON. Yes, sir; that is the point, and I fully acknowledge that I am not competent to judge, as the President must judge or the Secretary of the Treasury must judge or the Director of the Budget must judge. I can simply, at my level, with my knowledge of the military effort, both of the Air Force and of the Navy, and my close familiarity with the research and development program of both services—I, personally, felt that it was far too low a percentage of our national economy devoted to these fields. That was my personal opinion.

Senator BRIDGES. Are you speaking of it solely from your own point of view and admitting quite frankly that you did not approach it from the overall viewpoint?

Mr. NORTON. That is correct, sir, and I felt the same way when I was working for the Secretary of the Air Force, with respect to the Air Force's problem.

Senator BRIDGES. Reverting back, Admiral Bennett, to those who make the decisions on publicity, about which you were asked by Mr. Weisl. You said that these decisions came from Mr. Murray Snyder.

Does Mr. Snyder, so far as you know, have the power to formulate decisions on his own, or does he receive orders directly from the Secretary of Defense or someone else?

Admiral BENNETT. I would presume, since he is the Assistant Secretary of Defense, he takes his orders from the Secretary of Defense.

Senator BRIDGES. To be accurate, we would have to talk with Mr. Snyder about that; wouldn't we?

Admiral BENNETT. Yes, sir.

Senator JOHNSON. Admiral, what is your title again?

Admiral BENNETT. Chief of Naval Research, sir.

Senator JOHNSON. And you do know, as Chief of Naval Research, that you opposed the policy that was followed in connection with the publicity and the fanfare surrounding Vanguard.

Admiral BENNETT. That is correct, sir.

Senator JOHNSON. And you do know that the Secretary of the Navy protested on that policy.

Admiral BENNETT. Yes, sir; that is correct.

Senator JOHNSON. And so far as you know, all the people connected with the project in the Navy up through the Secretary felt that there was a difference between fact and fanfare, and that we ought to be very careful to point out that this was not the answer to the Russian sputnik, but just another one of many tests.

Admiral BENNETT. Even a little more than that, Mr. Chairman; we ought not to talk so much about it at all.

Senator JOHNSON. And that was made unalterably clear to the Assistant Secretary of Defense?

Admiral BENNETT. I believe it was, sir.

Senator JOHNSON. And the Assistant Secretary of Defense heard you through, and overruled you?

Admiral BENNETT. That is correct, sir.¹ There was no personal conference. I was overruled in statements made publicly.

Senator JOHNSON. Thank you, Admiral.

Senator Kefauver?

QUESTION OF RUSSIAN COMPLIANCE WITH IGY RULES

Senator KEFAUVER. Mr. Chairman, I would like to ask some of these gentlemen if the Soviets have complied with the International Geophysical Year rules with reference to the reports on the launching of satellites?

Admiral BENNETT. Senator Kefauver, this is a very difficult question to answer. The reason is that the rules, so-called rules, are actually committee agreements. I think at this point in time, we cannot say, certainly, they have not complied with them.

At another point in time, we will learn whether they will comply with the other part of the rules, which is to release the data from these satellites to the remainder of the IGY people.

Senator KEFAUVER. I believe that Mr. Sedov, one of the head Russian missile men, said they have complied with the Geophysical Year rules.

Admiral BENNETT. This was also a part of Mr. Blagranravov's statement in Moscow to which I referred. Their interpretation apparently is they are under no obligation to publicize an attempt. They did say, he did say, they were obligated to tell us whether they had a successful satellite.

Senator KEFAUVER. And they did make that announcement shortly after Sputnik I was launched.

Admiral BENNETT. That is correct.

Senator KEFAUVER. Well, was it in compliance with or alleged necessity of compliance with Geophysical Year rules that Mr. Snyder argued requiring this excess publicity about the Vanguard?

Admiral BENNETT. I was not privy to all of Mr. Snyder's discussions, sir. I presume that was at least a part of it.

Senator KEFAUVER. And the feeling of you gentlemen is that it should have just been publicized, which it was, as a test, and all this great certainty about what was going to happen should have been avoided?

Admiral BENNETT. That is correct, sir.

Senator KEFAUVER. Is it not true, gentlemen, or do you know if Mr. Snyder got his directions from the Information Division of the White House?

Admiral BENNETT. I have no knowledge, sir, at this point.

Senator KEFAUVER. Well, is it not true that the President, shortly after Sputnik I, in his first address gave the schedule for the launching of the 4-inch satellite to be in December, and that from that time, you

¹ Admiral Bennett, on reviewing the stenographic record, states that he did not at the hearing catch the connotation of the question to the effect that there had been a personal conference on this subject between Assistant Secretary of Defense Snyder and himself. Admiral Bennett states that there was in fact on this subject no personal conference between him and Mr. Snyder nor any other direct communication. Since his giving this testimony, he has learned he was wrong in his belief that Mr. Snyder, prior to the attempted Vanguard firing on December 6, 1957, had received any communication from the Navy of the kind referred to in the above questions and answers.

gentlemen had no alternative but to consider this as the meeting of the schedule announced by the Chief Executive?

Admiral BENNETT. That is in part correct, sir. The Navy was not responsible for including that schedule in its statement.

Senator KEFAUVER. Well, what part is correct?

Admiral BENNETT. Well, the statement itself was correct, sir, but I am referring now to the dates. We would have preferred to not have attached specific dates to the parts of the schedule.

Senator KEFAUVER. But the trouble began with the definite statement that a certain time, or in December, a 4-inch satellite would be launched; is that not the difficulty?

Admiral BENNETT. I believe the statement properly said that an attempt would be made to launch a small satellite, but it was possible—as I recall it, I do not believe a flat statement was made that a satellite would be launched.

Senator KEFAUVER. Mr. Chairman, I think it would be well to get the exact statement and have it made a part of the record.

I suggest that we get the statement as to what was going to be done in December, and have it made a part of the record so we can have a chronological history of what went on.

Senator JOHNSON. Very well.

(The statement referred to appears on p. 694.)

Senator KEFAUVER. Mr. Norton, you mention in your statement about pooling our scientific talent with competent scientists in friendly nations.

Were you a member or were you advised or did you advise Senator Henry Jackson in connection with his report made to the NATO Parliamentary Association?

Mr. NORTON. No sir; I did not; I was not.

Senator KEFAUVER. Are you familiar with that report?

Mr. NORTON. I am not familiar with it; no, sir.

Senator KEFAUVER. I wonder if you would mind studying it and submitting some statement on it for the record.

Mr. NORTON. I would be glad to do so; yes, sir.

(The statement referred to follows:)

JANUARY 24, 1958.

HON. LYNDON B. JOHNSON,

Chairman, Preparedness Investigating Subcommittee of the Committee on Armed Services, United States Senate, Washington, D. C.

DEAR MR. CHAIRMAN: During the hearing by your committee on December 16, Senator Kefauver requested that I submit to the committee any comments I might have on the resolution on the provision of scientific and technical personnel that was adopted by the third annual NATO Parliamentarians Conference.

I have read the resolution with interest and enthusiasm, as have a number of officers and civilians in the Navy Department. It is a painstaking and highly commendable analysis of a most pressing problem.

At the request of Senator Bush I recently forwarded to the committee a letter on measures open to us in remedying our deficiencies in scientific education. Certainly the work of your committee has done much to alert the country to our shortcomings. The resolution makes it clear that these problems are in large measure common to the whole of the Western World.

The experts in this field at the National Science Foundation and the Department of Health, Education, and Welfare are, of course, far better qualified than I am to comment on the feasibility and value of the specific proposals made in the resolution. They strike me as imaginative and sound. Needless to say, should a missile-training center or an institute for defense studies be set up (recommendations in pt. II), the United States Navy will be eager to assist in every possible way.

Let me emphasize again, as I did before your committee, my belief that we, as a nation, stand to gain a great deal by the exchange of basic scientific information with the European countries and by the closest possible association and cooperation between our scientists.

Respectfully yours,

GARRISON NORTON.

Senator KEFAUVER. Do you feel, sir, such a pooling would be of substantial help to us in our missile and satellite program?

Mr. NORTON. Yes, sir.

Senator SALTONSTALL. Would you repeat that?

Senator KEFAUVER. I asked, Would a pooling of such information be of substantial help to us and to the free world in our satellite and missile program?

Mr. NORTON. The answer is, "Yes, sir; I do."

Senator KEFAUVER. I have no further questions at this time.

Senator JOHNSON. Thank you, Senator Kefauver.

Senator Saltonstall?

Senator SALTONSTALL. Thank you, Mr. Chairman. I have just about 2 or 3 questions of Mr. Norton, because I understand that the admiral is going to be on again.

Mr. Norton, perhaps the chairman put it in the record, but I do not think he did. You have been in the Government service for some time; have you not?

Mr. NORTON. Yes, sir; I have, Senator.

Senator SALTONSTALL. Could you describe very briefly what offices you have held before you held the present one?

Mr. NORTON. At the end of World War II after my Naval Reserve duty, I went on duty in the Department of State as a Director of Transport Communications having to do with negotiating air-transport agreements, shipping agreements, telecommunications agreements, and that sort of thing.

Two years later, I was made Assistant Secretary of State in the same field. I served mostly in that field during the 4 years I was in the State Department.

Shortly after that, I went to work, at the request of Secretary Finletter, as his consultant in the field of research and development in the Air Force. I remained with him and with Secretary Talbott and Secretary Quarles in that capacity almost continuously until I was made Assistant Secretary of the Navy for Air, which is the job I now hold.

Senator SALTONSTALL. So that you have been in the research business, so to speak, under several Secretaries, and for how many years would that be altogether?

Mr. NORTON. I went with Mr. Finletter in 1951.

Senator SALTONSTALL. In 1951.

Mr. NORTON. Yes, sir.

Senator SALTONSTALL. Now, may I ask you just about 2 or 3 other questions.

I did not think you made it completely clear to Mr. Weisl, the organization of the research in the Navy. Am I correct in saying that the naval research is under your general direction, and that these bureaus which have their own research departments are purely adjuncts of the over all research of the Navy?

Mr. NORTON. Yes, sir; they are a part of the organization that we have.

Senator SALTONSTALL. Now, the committees are under the direction of the research chiefs, Admiral Bennett and yourself?

Mr. NORTON. That is, their research programs are monitored by Admiral Bennett here.

Senator SALTONSTALL. And they cannot undertake any original research without your approval?

Mr. NORTON. That is correct; yes, sir.

Senator SALTONSTALL. So that the whole, overall research of the various bureaus is done for the whole purpose of the Navy, and not for just any one bureau?

Mr. NORTON. Yes, sir; that is correct.

Senator SALTONSTALL. And they are the bureaus that are most able, because of their technical knowledge and technical work, to undertake that specific research?

Mr. NORTON. Yes, sir. Each one of those bureaus has certain naval laboratories under its direction. And very often the research being done, say, in a naval ordnance laboratory, will have direct bearing on something required by the Bureau of Aeronautics or Bureau of Ships.

Senator SALTONSTALL. These committees that you mention, and you could not tell just how many there were, many of these committees are ad hoc committees; are they not?

Mr. NORTON. Yes, sir. Most of them are.

Senator SALTONSTALL. Do the committees' decisions hold up the action of yourself as head of the research of the Navy?

Mr. NORTON. No, sir. Far from it. They are necessary for Admiral Bennett and myself to arrive at intelligent conclusions on the matters. We have a committee, the Naval Research Advisory Committee, which is established by law. I mean it is a committee of very distinguished scientists, who sit with us and advise us on our whole program.

Senator SALTONSTALL. That is established under the Unification Act?

Mr. NORTON. I think it was a subsequent law, Senator. I would have to look that up.

Senator SALTONSTALL. Admiral Bennett is shaking his head in the negative.

Could you tell us what law establishes that committee?

Admiral BENNETT. It is a section of what used to be called Public Law 588, establishing my office.

Senator SALTONSTALL. My time is limited, Mr. Secretary. May I ask one further question?

At my suggestion, the counsel asked you about Colonel Gossick and this work in Europe. It is my understanding that Colonel Gossick, a member of the Air Force research agency in Europe which, with funds of approximately \$1,800,000, collaborates with the French, the Belgians, and other friendly countries in stimulating research work in those countries; is that your understanding?

Mr. NORTON. Yes, sir. That is my understanding. I am sure that Admiral Bennett here, or Admiral Hayward, can give you more details of how Colonel Gossick operates, than I am able to do.

Senator SALTONSTALL. Mr. Weisl, perhaps we could go into that at a later time, and not take the time of the Secretary now.

I think this program of Colonel Gossick should be brought to the attention of the committee.

Mr. WEISL. Yes, sir.

Senator SALTONSTALL. Do you want to do it now through Admiral Bennett, or later on?

Mr. WEISL. I think we ought to do it now, if the chairman consents.

Senator JOHNSON. All right.

Senator SALTONSTALL. Admiral Bennett, have you ever heard of Colonel Gossick and his research team?

Admiral BENNETT. Senator, I am sorry, but I never heard of Colonel Gossick.

May I just say, Mr. Chairman, that I think it would be helpful if a memorandum could be inserted at this point describing Colonel Gossick's activities?

(Subsequently, the Department of Air Force forwarded a memorandum entitled "Research Agency in Europe," which follows:)

RESEARCH AGENCY IN EUROPE

1. The agency referred to is the European office of the Air Force Research and Development Command. This office, located in Brussels, Belgium, is headed by Col. Lee Gossick. The office was established in 1952 to contract for research and scientific projects in European countries. At present the European office has \$3,300,000 in research contracts with 180 contractors located in 16 countries throughout Europe, the Middle East, and North Africa.

2. Colonel Gossick's office is authorized to contact directly the Army Operations research office in Frankfurt, Germany, and the Office of Naval Research in London. The latter-named offices were established in 1956; their purpose is similar to that of the European office of the Air Force Research and Development Command. These offices hold periodic meetings to discuss basic research programs. The last such meeting, which was attended by representatives of the Secretary of Defense, convened at London in September 1957.

Mr. WEISL. Senator Saltonstall, I believe the Secretary of the Navy is here; is he not?

Senator SALTONSTALL. Yes; perhaps he can describe this.

Mr. WEISL. Maybe you can question him about it.

Senator JOHNSON. Very well.

If Secretary Gates will come forward, he has previously been sworn, and if Senator Saltonstall can clear up this situation while the Secretary is here, he may do so.

TESTIMONY OF HON. THOMAS S. GATES, JR., SECRETARY OF THE NAVY—Resumed

Senator SALTONSTALL. Mr. Gates, can you tell us very briefly the functions of, what you know about Colonel Gossick's committee?

Secretary GATES. I cannot, Senator.

Senator SALTONSTALL. All right.

Secretary GATES. I think we deal through this organization, with which I am familiar without details, through Admiral Kelley, who is the Navy member of weapons development team in Paris.

I think our contact with that committee is through him.

Senator SALTONSTALL. All right. Thank you. I will ask him.

Thank you, Mr. Chairman.

Senator JOHNSON. Very well.

Senator SALTONSTALL. Mr. Chairman, I will just say this: I think a memorandum from the proper person in the Air Force, without calling another man, would be the way to get the information.

And if, when counsel gets that information, he wants further questioning, we can call somebody back.

Senator JOHNSON. Very well. I suggest you and counsel work out the arrangements satisfactory to both of you, and carry it forward in the form of requesting whatever memorandums you may feel is necessary.

Secretary Norton, will you come back?

TESTIMONY OF HON. GARRISON NORTON—Resumed

Senator JOHNSON. Senator Stennis?

Senator STENNIS. Mr. Chairman, I want to commend the chairman and the committee counsel for having the three witnesses up here altogether.

They represent the civilian and the service personnel that are charged with these responsibilities. I think they help each other and it helps us to have them all here and it certainly saves time.

Secretary Norton, I have been impressed with your work in various capacities here and I believe that you gentlemen are the ones to ask some questions that I have had here for 2 or 3 days wanting to get into, and that is with reference to the different contractors, prime contractors, and subcontractors you may have working on these missiles.

I have an idea that that is a source of a great deal of your concern, and it requires time and you have the problem there of duplications and getting things moving and making decisions I imagine.

Now does that come within your sphere of activity?

I want to know how many prime contractors you have on some of these missions, Vanguard, for instance.

Do you happen to know how many contractors and subcontractors?

I am using that as an illustration.

Mr. NORTON. Yes.

Senator STENNIS. I am not rehashing anything that happened.

Mr. NORTON. I think Admiral Bennett here could give you a full list of them. I, of course, know the main ones.

Senator STENNIS. I am not trying to go into them as individuals, I mean single out their names particularly, but if you or either of you gentlemen could give the committee some light on just what your problems are in connection with the contractors, prime contractors, subcontractors, and the decisions that have to be made, could one of you give us a picture on that?

Mr. NORTON. Senator, I am not sure I am clear in my mind as to just what is in your mind on this.

Senator STENNIS. I used the Vanguard there as an illustration. In these research projects, I have had an idea that some of the slowdown there was due to the tremendous problem involved in trying to coordinate the different branches of the research. I understand you let some of it out in contract, do you not, and then maybe the Navy does some of it with their own scientists?

I believe a great deal of your problem resolves around—

Mr. NORTON. I think I see what you are getting at, Senator. This, of course, is a matter which is of tremendous interest to me. I would

say this, and I would like Admiral Bennett to speak to it a little more closely, because he is more directly associated with it.

I would like to say this: In general, in our research program, the contractor problem and the subcontractor problem have not loomed as large, from the point of view of delays and slowdowns, as it sometimes does in the more advanced stages of development, because it is a simple matter, really, to coordinate and expedite as best you can a research program.

Senator STENNIS. Let's break it down then. If one of you gentlemen could give us, briefly, something on your problems with reference to the research and then the development and then the production phase, I believe that would fill out a part of a picture here that has been lacking.

Mr. NORTON. Admiral Bennett?

Admiral BENNETT. Senator Stennis, I will attempt to answer at least the first two parts, and I will also use the Vanguard as an example. There is 1 prime contractor, and over 200 subcontractors, and we have no particular problem. As far as contracts for research are concerned, with which I am fully aware, we have no particular problem. We deal with universities, nonprofit institutions, and foundations, and we have long since reached very amicable and agreeable working relations with them.

Now, as to production, this is a big subject, and I suggest that, if you want to discuss production contracting, you should get someone who is at present more closely associated with the production business.

Senator STENNIS. All right; who is the prime contractor, say, in Vanguard? I am not trying to examine Vanguard, as such, but I want to use it as an illustration.

Admiral BENNETT. The Glenn L. Martin Co.

Senator STENNIS. You say you have 200 subcontractors, then, on the Vanguard alone?

Admiral BENNETT. Yes, sir.

Senator STENNIS. Isn't it inevitable that there be some conflict, that is, a difference of opinion, on many of these items, and that this has to be resolved by someone, the difference?

Admiral BENNETT. Basically, Senator, the differences of opinion come about when you write the basic specification. Once the basic specification is accepted by the prime contractor, he then interprets it to the subcontractors, and, naturally, at each stage in this dissemination, in each stage of the work, there are bound to be differences of opinion as to how it should proceed. But this does not mean that there is any conflict or any slowdown. This is inevitable in the process of developing new articles.

Senator STENNIS. So, on your research and the development, why, this is not so much of a problem. There is no slowdown on it?

Admiral BENNETT. Not as far as I am aware, usually; no, sir.

Senator STENNIS. I am encouraged by that. I was referring to the difference of opinion on designs and just what steps would be taken. But, after a decision is made on that, the contractor then does not have any trouble in moving in and filling the bill; is that correct?

Admiral BENNETT. That is usually correct, sir.

Senator STENNIS. Is there any comment you would like to make on that general subject that I brought up? I thought it was a contributing factor on your problem.

Admiral BENNETT. Well, sir, I have had a rather considerable experience in the production contracting of electronics equipment, and I would not say, Senator, that there was any particular slowdown in the areas that I am familiar with due to this sort of controversy. Now, before a contract is let, of course, we are all familiar with the long contracting process. As far as I have observed it, the delays more frequently occur before contract rather than after contract.

Senator STENNIS. Secretary Norton, was there anything you wished to add to that, or Admiral Hayward?

Admiral HAYWARD. I was going to emphasize what Admiral Bennett said, that the delay is prior to the contracting, particularly where the system is very complex and you cannot write a specification. How you pick the contractor and these sort of decisions are the ones that take the time.

Senator STENNIS. Point that out again. What is it that takes the time?

Admiral HAYWARD. For instance, prior to the actual contract, where you don't have any written specification. The more complex it is, the harder it is to write a specification. You cannot write a specification and go ask for bids on a lot of these systems. You have to make these on the basis of the ability of the contractors that you are doing the business with to do the job, and this is what takes time, really.

Senator STENNIS. Who has the authority over these subcontractors? Is that a matter for the prime contractor to make decisions?

Admiral HAYWARD. In the description by Admiral Raborn, on the Polaris system, he will describe how this is handled, which is a good system where you have a systems responsibility, I believe, Senator, and it will be covered in detail.

Senator STENNIS. That is admiral who, now?

Admiral HAYWARD. Admiral Raborn.

Senator STENNIS. Thank you very much.

Mr. Secretary, do you have anything to add on this problem?

Mr. NORTON. No, Senator.

Senator STENNIS. I thank the gentleman very much.

Thank you, Mr. Chairman. That is all I have.

Senator JOHNSON. Thank you, Senator Stennis.

Senator Flanders?

Senator FLANDERS. Secretary Norton, I have long been concerned with the theories back of the educational methods in this country. Therefore, your statement on the fourth page of your testimony caught my eye. You said:

There is something about European education and environment that breeds good research.

Could you state briefly what there is in the European education and environment that breeds research.

Mr. NORTON. Well, Senator, that is a big subject, and, if I were to try and answer it briefly, I would not be able to answer it, and I am afraid I would not even be able to answer it in a long-winded statement, sir.

I don't know if it is in the water over there or whether it is in the point of view of the people or what it is, but there is an attitude in Europe about what counts in life, and it is not just money. It is not just how many air-conditioned Cadillacs you have. If a man happens

to be good as a musician, if he is a talented artist, if he is a teacher in a school, if he has a good scientific brain, he has the respect of the community.

He is as much respected as the richest man in that community. I suspect there is a good deal of association between where we stand today in creative scientific talent as compared with the Europeans, and the point of view of our people about what really counts in the world.

Senator FLANDERS. Mr. Secretary, I thank you for putting that statement into the record. It is a valuable statement, Mr. Chairman, and should be in the record for our future consideration.

Now, I have another question I wish to raise which I think perhaps should be addressed to Admiral Bennett.

A little time ago I suggested that perhaps our missiles testing station and range should be in the Pacific, where we would not have to build a fence around the thing.

Are there logistic or other reasons which make it undesirable to move the testing and the range to the Pacific?

Admiral BENNETT. Within my competence, Senator, I would say the primary question was one of money. It would be very expensive.

Senator FLANDERS. One of what?

Admiral BENNETT. Money. It would be very expensive to move.

Senator FLANDERS. Granted money, do you think there would be any advantages or inescapable difficulties?

Admiral BENNETT. As far as I can now tell; no, sir.

Senator FLANDERS. Thank you.

Now a third question.

It may be that I should leave this for a later witness, but I would like to ask you, Mr. Secretary, whether you pursue the course of contracting out a whole weapons system.

Mr. NORTON. Yes, sir.

Occasionally we do that. In certain cases there is a real advantage to doing that. The Navy of course has a problem of relating usually ships with weapons, and sometimes it is a 3-way problem—ships, aircraft, and weapons—or even a 4-way problem, because you have to get electronics into it, or maybe a 5-way problem if you bring in navigation.

Now, these things can sometimes spread so far, so wide, that you find it is not profitable to even trust the development of an entire weapons system to one contractor.

I think Admiral Raborn again would provide you with a good example of where the system that he is engaged upon is so broad that the organization that we have set up to do that, in my opinion, makes maximum use of the weapons system contractor where he will do you the most good, but at the same time it takes into consideration these other factors of ships, navigation, and so on.

Senator FLANDERS. You have never considered, I take it, the contracting out of whole families of weapons systems?

Mr. NORTON. We have considered it; yes, sir; and I think we might possibly give you some examples of that, although you have to define what you mean by "families" a little bit, I guess.

Senator FLANDERS. However, that perhaps would come under Admiral Raborn?

Mr. NORTON. I think there again, sir, he could give you a very good cross section of just what you are getting at.

Senator FLANDERS. Thank you.

Mr. Chairman, I will leave those questions.

Admiral HAYWARD. Senator Flanders, I think I could answer one specific one on that, and that would be the surface-to-air category that the Navy has followed with the applied physics laboratory of Johns Hopkins. They have had a whole family and system of weapons, and that would be the answer to that.

Senator FLANDERS. Is it breaking security to tell us what kind of a family?

Admiral HAYWARD. I would rather discuss it in closed session.

Senator FLANDERS. I see.

Thank you. That is all, Mr. Chairman.

Senator JOHNSON. Thank you very much, Senator Flanders.

Senator SYMINGTON. Mr. Chairman, first I want to read a short statement.

SENATOR SYMINGTON ON DISCHARGE OF MR. HOLADAY

There have been some articles in the press which might imply that I now advocate the discharge of Mr. Holaday from the Department of Defense.

I do not so advocate. In my opinion, the structure now characteristic of the Department of Defense and the system of functioning under that structure are primarily responsible, not necessarily any particular individual.

In other words, I believe the structure is the scapegoat.

And this structure is costing the taxpayer billions of dollars a year. More important, it is affecting the security the American people should have.

I agree with the recent testimony of Generals Doolittle and Gavin that if we are to obtain maximum defense at minimum cost, we must change some of that structure, and these hearings are bringing out one fact: the time is getting short.

Now, Mr. Secretary—

Senator JOHNSON. I would like to observe in that connection if the Senator will yield—

Senator SYMINGTON. I will be glad to yield.

Senator JOHNSON. So far as the chairman is aware, there is no reason why anyone would be justified in saying that the chairman or any member of the committee, particularly the Senator from Missouri, has reached any conclusion on who ought to or who ought not to be discharged.

I think the Chair has made it abundantly clear that we do need some drive on our missile program, and we had better get going with it.

Now how we get that will be determined at the proper time and the proper place by the proper people.

I thank the Senator.

Senator SYMINGTON. I thank the Senator.

Mr. Norton, it is a privilege to see you here, sir.

Mr. NORTON. Thank you, sir.

Senator SYMINGTON. We all know of your long and fine public service. I have a few questions to ask.

You mentioned in your prepared statement, and I quote :

More funds we do need in my opinion, and I trust we shall develop this subject as your committee proceeds.

Is the Polaris completely free of any fiscal restrictions?

Mr. NORTON. Yes, Senator, it is.

Senator SYMINGTON. Is that because you have taken money from other projects which you think are also important?

Mr. NORTON. Yes, Senator, that is partly correct.

Senator SYMINGTON. So when we get the heat put on the missile situation we take money away from other things we still consider important, and concentrate on a particular situation so we can have a good story before the people. Is that a fair analysis?

Mr. NORTON. With all respect to you, Senator, I would say that is not a fair analysis.

Senator SYMINGTON. Would you put it the way you think fair?

Mr. NORTON. When I said that a portion of the Polaris program is funded at the expense of other things, I was referring to the program as it has been running along since we got it started.

I was not implying the additional funds which are now being made available to us for an accelerated program for Polaris is taken out of any other part of Navy's work.

Senator SYMINGTON. Where do they come from then?

Mr. NORTON. Well, we hope—I am not sure where they come from yet.

Senator SYMINGTON. I will ask Admiral Bennett or Admiral Hayward.

Admiral BENNETT. I believe Mr. Norton is referring to funds from the emergency fund of the Secretary of Defense.

Senator SYMINGTON. So that you are getting additional funds from the Office of the Secretary of Defense to straighten out the Polaris situation?

Admiral BENNETT. That is my understanding, sir.

Senator SYMINGTON. Admiral, don't misunderstand me. I think Polaris may well be the most important missile development of them all, at least in the foreseeable future, but going back to Mr. Norton, and if either Admiral Bennett or Admiral Hayward would like to comment on it, I should be glad.

We are not going to fight with Polaris, or Atlas, if we are attacked, for some years to come, are we?

Mr. NORTON. That is correct, Senator.

Senator SYMINGTON. And therefore it is important in addition to following the romance and importance of this new missile picture generated by sputnik, to still give major consideration to our forces in being, is it not?

Mr. NORTON. I certainly agree with you, sir.

Senator SYMINGTON. In 1957 we heavily cut the Navy's original position, for admittedly fiscal reasons; is that not correct?

Mr. NORTON. That is correct; yes, sir.

Senator SYMINGTON. Have any of those reductions been replaced since the 4th of October?

Mr. NORTON. I am not sure whether I can answer your question or not. Since the 4th of October we have received word that we will have a very large increase in our Polaris program.

Senator SYMINGTON. With the exception of Polaris, to the best of your knowledge or any other representative of the Navy present here, have there been any replacements of the reductions made in Navy research and development, or maintenance and operations, or procurement cut out of the Navy in calendar year 1957?

Admiral HAYWARD. Yes, sir; in research and development Mr. McElroy did away with the instruction of the 10 percent reduction of procurement and production funds that were to come out of research and development. That was restored.

Senator SYMINGTON. That was never actually taken out, was it? It was planned to be taken out in theory in August, and then replace that 170 million, your share of that 170 million?

Admiral HAYWARD. Yes, sir; our share of it.

However, you could not program it. We had to make sure that we had that.

Senator SYMINGTON. I see.

Admiral HAYWARD. So that delays the program.

Senator SYMINGTON. That is a good point, Admiral.

Now is there anything further in the way of replacement of reduced research-and-development funds that were reduced that you know of?

Admiral HAYWARD. I know when we were in the straitjacket to start with, the first decision Admiral Burke made was that we would not reduce research and development.

That would be the last thing we would do, Senator.

Senator SYMINGTON. Are you in a position, or is Mr. Norton, or Admiral Bennett, to say whether or not has there been any replacement in the reduction in Navy maintenance and operations funds, made in the calendar year 1957?

Mr. NORTON. Not as far as I know, Senator.

Senator SYMINGTON. Has there been any replacement in the heavy reduction in the planned procurement of planes made for the Navy, in the calendar year 1957?

Mr. NORTON. No, sir.

Senator SYMINGTON. You said Mr. Secretary that other tests on the Vanguard had succeeded; and that you felt the third test was likely to fail.

I was not quite sure whether you gave the reason why you felt it might fail?

Mr. NORTON. Senator, I don't think I put it quite that way.

Senator SYMINGTON. Please correct me.

THREE STAGES OF VANGUARD FIRED SUCCESSFULLY

Mr. NORTON. I was personally of the opinion that the Vanguard program as a test program, and from my knowledge of other test programs in the missile business, had been an extraordinarily successful program.

We had fired in succession three test vehicles, each one of which was a success.

According to the batting average that you get in testing these things, we were dangerously due for a failure.

Senator SYMINGTON. Excuse me.

You fired successfully the first stage and you fired successfully the second stage?

Mr. NORTON. Yes, sir.

Senator SYMINGTON. Did you fire successfully the third stage, or was it 1 of the first 2?

Mr. NORTON. The third stage had been fired separately successfully?

Senator SYMINGTON. And successfully?

Mr. NORTON. Yes, sir.

Senator SYMINGTON. So that the reason you felt you were likely to fail was that this was the first package of all three stages?

Mr. NORTON. Yes, sir.

Senator SYMINGTON. Admiral Bennett, would you comment on that, sir?

Admiral BENNETT. I think, Senator, it would be clearer if we would relate this to the laws of probability.

If you are in a development project, you know the probability is that all of your tests cannot be successful no matter what they are, and as Mr. Norton explained, since the first three tests were successful, then mathematically it was all but improbable that the fourth test would be successful.

Senator SYMINGTON. And I am correct that this was the first test of the combined three stages, was it not?

Admiral BENNETT. That is correct.

Senator SYMINGTON. That would add probably to the probability?

Admiral BENNETT. That is correct.

Senator SYMINGTON. Did you feel, Mr. Secretary, that our satellite would be the first to go up?

Mr. NORTON. No, Senator. I personally felt that there was a very strong likelihood that the Russians would put up the first satellite.

Senator SYMINGTON. You know, do you not, that when the Navy requested appropriations last August, it was with the premise that ours would be first.

That was at least the implication of the testimony?

Mr. NORTON. I am not familiar with the basis on which the Navy—

Senator SYMINGTON. That was in the supplementary appropriation testimony.

Admiral BENNETT. I believe I can answer that, Senator Symington. I believe the statement was that we hoped it would be the first one.

Senator SYMINGTON. I will read the statement.

It was made on August 2 by the Deputy and Assistant Chief of Naval Research, Capt. Alfred B. Metsger, United States Navy, earth-satellite program:

Mr. Chairman and members of the committee—

He gives his name and then says—

Sometime during the coming year, a small new object is scheduled to appear in the skies above us. It will be circling through the heavens in its own orbit, like the moon and the planets. But this will be a heavenly body that man has fashioned with his own hands and placed in an orbit around the earth. It will be the first artificial satellite.

That was the testimony. I am not criticizing the fact he thought we would be first.

Admiral BENNETT. Yes, sir.

Senator SYMINGTON. What I might criticize was that many people said they were not at all surprised when we were not first; and yet our people who were closest to it felt we would be first.

I do not want to labor the point.

Mr. NORTON. Senator, I wonder if I could just, since you asked me the question, at least give you the framework of my surprise in this.

I do not want to attempt before this committee to claim any foresight about the propaganda importance of putting up the first satellite. I personally felt that—well, I will put it this way: I never thought of the propaganda effects of it, and I personally concurred very strongly with the National Security Council's decision in 1955 that we should concentrate all of our scientific talent and energy on the missile, and that we should not permit a satellite effort to detract or dilute in any way from that major effort.

Senator SYMINGTON. Mr. Secretary, have you seen a chart which Mr. Trevor Gardner put in Life magazine, showing the maze of missile management?

Mr. NORTON. Yes, sir; I have seen that.

Senator SYMINGTON. Is the chart accurate?

Mr. NORTON. I am not prepared to say whether it is accurate or not, but I certainly share Mr. Gardner's point of view in general on that subject.

Senator SYMINGTON. What point of view is that?

Mr. NORTON. That it is a maze.

Senator SYMINGTON. By that do you imply it is an inefficient structure?

Mr. NORTON. I personally feel, Senator, that the kind of effort that we needed, based on the intelligence that we had received, firm, hard intelligence, to get into this missile business was not the effort that we put on it, and I think that what Mr. Gardner is pointing out in his article is an accurate reflection of what I mean.

Senator SYMINGTON. I appreciate your comments, but you did not entirely answer my question.

Do you think the current setup is an inefficient setup? Putting it another way, you agree with Mr. Gardner?

Mr. NORTON. Yes.

Senator SYMINGTON. He called it a maze of missile management. He thinks it is inefficient. Do you think it is?

Mr. NORTON. Yes, sir, I do, Senator.

Senator SYMINGTON. Have there been any major changes in it that you know of?

Mr. NORTON. There have been a number of changes. I do not know whether they are major or not.

Senator SYMINGTON. Are you satisfied now with the present setup?

Mr. NORTON. No, sir, I am not.

Senator SYMINGTON. What do you think should be done in order to get our ducks in a row on this whole question of research and development?

Mr. NORTON. Senator, this would be my personal opinion, of course: It seems to me we have reached a stage here in the general excitement following the two Russian launchings of satellites, where we are beginning to think in sort of Buck Rogers terms about things.

I think it is high time that we in the United States kept our mouths shut and got on with the business. The No. 1 business is the missile business; the No. 1 business is to get a warhead from here to its target with accuracy, using the ballistic vehicle in various ranges.

I personally feel that nothing should be allowed to stand in the way of that, and nothing should dilute that effort. We are very close to getting it.

Senator SYMINGTON. With what effort?

Mr. NORTON. We are close to getting it with several weapons, in my opinion.

Senator SYMINGTON. Would you name them, please?

Mr. NORTON. I would say that we are close to getting it with the Atlas, and the Titan, the Thor, and the Jupiter, and the Polaris.

Senator SYMINGTON. You have named the five ballistic missiles that we are planning to make, including the three IRBM's.

Mr. NORTON. Yes, sir.

Senator SYMINGTON. And the two ICBM's. When you say that, people might feel that you were talking in operational terms.

I agree with you that at times it is good to keep our mouths shut; but a lot of people kept their mouths shut to the point where this country was most complacent until sputnik went up. Then some mouths began to open, all around the country.

Getting back to the matter of missiles, let us take the ICBM's, or let us take your own solid propellant IRBM, Polaris.

Are you implying we will be operational within a few months?

Mr. NORTON. No, sir, I am not implying that.

Senator SYMINGTON. When would you say that we would be operational?

Mr. NORTON. I think I would rather answer that, if I may, in executive session, Senator.

Senator SYMINGTON. One of the reasons might be that it might be a little longer than your previous comment would indicate?

Mr. NORTON. No, sir, I wouldn't say that.

Senator SYMINGTON. Well, then, make the previous comment again, will you?

Mr. NORTON. I am not sure which one you are referring to, Senator.

Senator SYMINGTON. Well, the length of time which you implied would be fairly short before we would have missiles, especially the Polaris and ICBM's.

Mr. NORTON. I think we are well on the road to getting what we set out to get, Senator, and I would—the point I wanted to make here was this: We have been hearing a great deal in the last few days and few weeks about how we should go into a tremendous satellite and space program. I do not belittle the importance of satellites and space matters one bit, but what I want to emphasize is, let's get the first thing done first.

Senator SYMINGTON. Well, Mr. Chairman, time is about run out, but I want to make this comment:

It is just as important to maintain our forces in being as it is to pursue the Russians in the missile picture.

Mr. NORTON. I certainly agree with that.

Senator SYMINGTON. I also feel, based on open and executive sessions, that implications are being given, at least with respect to the ICBM's and the Polaris, which make the American people feel it is not going to be years before they are going to be here in operational quantities. And operational quantities are what we are talking about. And it is going to take years.

I thank the Chair.

Senator JOHNSON. While we are on that, I would like to take just a minute while the admiral is here. I have not used my question period.

ADMIRAL BENNETT SAYS VANGUARD WILL ORBIT IN 1958

Admiral, do you know of any competent engineer who believes that Vanguard will meet its objective by the end of 1958?

Admiral BENNETT. Yes, sir. All of my competent engineers so believe.

Senator JOHNSON. Are you speaking for all of them now?

Admiral BENNETT. Yes, sir.

Senator JOHNSON. Well, we have in the committee files some very outstanding authorities who have expressed grave doubts about it, and that prompted that question. We also have some outstanding authorities who have said to us that they have doubt that you will be able to orbit a full-scale payload in the year 1958, and I would like to have your opinion on those statements.

Admiral BENNETT. Well, if such people have such opinions, they have failed to communicate them to me, sir, and that is all I can say.

Senator JOHNSON. Have many communicated their opinion to you?

Admiral BENNETT. I deal with the people in charge of the project, and many of their subordinates, quite frequently. I have heard no expression of the sort of facts which you state, that the program will not succeed its accomplished mission, which is to put a satellite in orbit in 1958.

Senator JOHNSON. So far as you know, every engineer of your acquaintance believes that you can put a satellite with a payload in orbit in 1958?

Admiral BENNETT. Yes, sir.

Senator JOHNSON. And you have heard that not only from engineers working on the project, but from independent engineers, too?

Admiral BENNETT. That is correct, sir.

Senator JOHNSON. Do you share that opinion, Mr. Secretary?

Mr. NORTON. Yes, sir; I do, sir.

Senator JOHNSON. You, admiral?

Admiral HAYWARD. Yes, sir, I do.

Senator JOHNSON. Thank you very much.

Senator BUSH?

Senator BUSH. Mr. Secretary, I am sorry I was not here when you presented your original statement, but I have caught up with it, and I have been through it, and I want to go back to page 3 of that statement, at the bottom of that page.

But first I want to join with Senator Symington in congratulating you upon your splendid record of service here since World War II, and also upon your splendid testimony here this morning; the direct and forthright nature of it, I think is very, very helpful to the committee.

Mr. NORTON. Thank you, Senator.

Senator BUSH. I want to get into the question of education, which you raise in the latter part of your statement, and which you con-

clude by speaking of the tremendously increasing need for our own program of scientific education for selected young men.

I suppose that means the Navy's program. But I wish to direct my questions to a little larger area, and go back to comments by Dr. Teller and Dr. Vannevar Bush, and I think possibly General Doolittle, too, dealing with the whole question of the training of more raw material at the elementary and secondary school levels.

These gentlemen laid very great importance on that, and I wondered if you have given any thought to that area of education in the field of science, and whether you would like to say anything for the record in that connection.

Mr. NORTON. Yes, sir, I have given much thought to this.

The reason I put the word "selected" there in my statement was this: I feel that I agree entirely with those who wish to raise the emphasis in our primary and secondary education on scientific fields. I do feel very strongly, however, that the fastest way to get the young men of real competence to the front where we need them is to set up some system of selective education whereby the really bright young minds can be weeded out and given much more rapid education, much more complete education, than the average mind is capable of assimilating.

I personally feel that a program such as Secretary Gates has outlined recently is looking in that direction. There we have an opportunity to select this type of young mind. We hope to do it by means of a committee of the most competent educators and scientists we can find to do the job.

I personally feel if we could extend that kind of approach, if other services will do it, if other agencies of Government will do it, that we will move as rapidly as possible in the direction of weeding out our really bright young minds and giving them the best opportunity we can give them to get a scientific education.

Senator BUSH. Well, I think that is fine. But my question was a broader one than that, toward increasing the supply of people who are going to be competent to go on with scientific training at the third stage, let us say. In other words, going back to Dr. Teller and Dr. Bush's comments about our elementary and high-school education, the lack of required courses in the sciences, and I believe some of them contrasted that with the requirements imposed by Russia upon their students at that level, where almost everybody is required to take sciences at the high-school level and most of them in the elementary school level, so that when they come up to the age of 17 or 18 they have a big crop to choose from for the kind of a program you were just discussing.

Mr. NORTON. I agree with you, Senator; I think I agree with Dr. Teller.

Senator BUSH. Now, the point I wanted to bring out particularly was this: In questioning these gentlemen myself after their testimony, as to whether they had any specific recommendations to the Congress as to what we could do at the Federal level to stimulate bringing up a crop of potential scientists through increased requirements at the elementary and secondary level, I asked them did they have any recommendations of legislation which we, the Congress, should consider next year?

And, unfortunately, we got no recommendations, nor any promise that they would suggest any. They fell back on the thought that the

cure for this deficit is a lot more difficult to suggest than the fact that there is one.

I just thought that with your long experience in this field, and your long acquaintance with the Government, that while you might not be prepared today to offer some thoughts in this connection, I think we need some suggestions in this area, and I, for one, would be grateful to you if you felt like contributing to the committee, for the record, a memorandum of suggestions in that connection.

Mr. NORTON. I would be very glad to try my hand on that, Senator. I would like to try that, very much.

Senator BUSH. Thank you.

Senator JOHNSON. Mr. Secretary, if you will supply that for the record, without objection it will be included in the record.

Mr. NORTON. I appreciate the opportunity to do it, Mr. Chairman. (The information referred to follows:)

THE ASSISTANT SECRETARY OF THE NAVY FOR AIR,
Washington, January 24, 1958.

Hon. LYNDON B. JOHNSON,

Chairman, Preparedness Investigating Subcommittee of the Committee on Armed Services, United States Senate, Washington, D. C.

MY DEAR MR. CHAIRMAN: In the course of the public hearing of your committee on December 16, 1957, Senator Bush requested that I prepare for the committee some suggestions as to how the Congress can facilitate and further the education of the scientists our Nation so evidently needs. Due in large part to the efforts of your committee, the subject of scientific education has received much attention, in my opinion long overdue. The new public awareness of our needs in this field will prove invaluable, but in fairness to the many who have concerned themselves with this matter in the past we must remember that neither the problem nor the recognition of its gravity is new.

In 1947 a report prepared for the President stated that: "The situation in which we find ourselves today in respect to scientific manpower is dangerous not only to our national welfare but to national security. It is of the utmost urgency that steps be taken to increase and improve our scientific manpower pool." (Manpower for Research, vol. 4 of Science and Public Policy, p. 27, A Report to the President, by John R. Steelman, Chairman, the President's Scientific Research Board, October 11, 1947.) In the years since that time successive groups studying the subject, including the Jackson Parliamentarian Committee of NATO, have made some excellent specific suggestions on meeting the situation.

For the most part these recommendations center around three basic requirements. The first of these concerns the necessary physical plant for adequate education. Quite simply we lack sufficient school buildings and classrooms to meet the needs of a rapidly growing population, and most particularly we lack the laboratories and specialized equipment which are essential to education in the sciences.

The second requirement concerns the Nation's teachers. Much has been written on this recently, and we are all aware that we will need more teachers—in all fields—and in many instances their qualifications will have to be raised. If these needs are to be met we will see increases in teaching salaries to make them more competitive with other professions, enlarged educational facilities for teachers, and, less tangible, but perhaps most important of all, improvement in the social and professional status of teachers.

The third requirement concerns the Nation's promising students themselves; the end products of the whole effort. We will need a system of scholarships adequate to allow the potentially valuable student to continue his education and realize his potential. Then too, and this is hardly subject to legislation, the attitude of the Nation's youth toward scholarship must be influenced away from the present tendency to belittle the serious student as something of an eccentric.

Reviewing the recommendations that have been made in this already well-examined field, and pondering the reasons why we are still in today's disturbing position, I have concluded that the difficulty does not lie directly in the complex technical and administrative problems involved. These I am sure can be met and overcome once we have defined our goals more precisely and have reexam-

ined, and where necessary modified, some of the social customs and traditions around which our educational system has grown; customs which have been both workable and desirable through the years, but which may prove incompatible with today's needs.

In our effort to make up for lost time in the nurturing of scientific talent, we must realize that there is no way to produce a vast increase in the number of scientists for the years to come. There are, after all, only relatively few students in any group who possess the intrinsic ability to carry their study and their subsequent work into the fields of advanced scientific research. We must not confuse the education of scientists with the education of engineers and technical men who apply the findings of the scientists. The Nation has need for both types, but the problems of their education differ, and in the past our strength has lain more in the production of imaginative and competent engineers.

An efficient scientific educational system must make two things available to the student. First, it must provide a sufficiently thorough scientific grounding at the secondary school level to provide the student with a firm basis for his later work and to provide his teachers with an opportunity to identify and nurture potential talent. Objective tests are of some value in the selection process, but observation over a period of time by the individual teacher is the surest way of spotting the future scholar. Then the system must be sufficiently flexible to allow the promising young scientist to be brought along as rapidly as his own ability and the necessary requirements for rounding his education in other fields will permit. This cannot be a mass-production business. During his undergraduate period, and ideally in the latter stages of his secondary education, the student should be able to obtain individual or small-group instruction at a level higher than that called for by the requirements of the degree toward which he may then be working.

Maintaining an educational system that has sufficient flexibility to allow the topflight scholars to find their own level and progress at their own speed, apart from the norm of their age group, is a complicated and inevitably an expensive business. When these qualitative requirements are added to the costs of augmented faculties, increased teacher salaries, student scholarships, and new labs and other facilities, it is evident that the national outlay for education in the future is going to be extremely high. Not only will there be a heavy initial investment in building, but the continuing costs will run through the years.

Thus there is no longer any question that there must be substantial Federal aid to education. The President's message of this month has already recognized that fact. Indeed, unless many of the Nation's communities and not a few of the States are ready to make some marked changes in their tax structures, we may find that the Federal Government will have to bear a major part of the Nation's bill for education.

The problem that must now be objectively explored and settled is the form in which the necessary Federal guidance and review can most efficiently and acceptably accompany this aid. As a people, we are virtually unanimous in holding to the traditional concept that Federal interference should be held to a minimum and control of educational standards should be a matter for the communities and the States to determine for themselves. However, the evident and urgent need to develop our student potential to the utmost, together with the very considerable investment called for from the country as a whole, argue that steps must be taken to insure that the quality of instruction and work will be high throughout the country. Something approaching a single set of minimum standards must be administered, particularly in the secondary schools, or we will find the opportunities for advancement to college and postgraduate work limited to the graduates of only a part of our high-school system, with a corresponding loss of potential talent. Establishing the machinery to insure that such standards are observed and met will be a complex and politically difficult business.

There is another matter of custom, or more properly expectation, which the country may have to reexamine if we are to provide a high level of educational opportunity for our competent and promising scholars over the next decade. We have increasingly come to look on a college education as the natural right of any youth able to meet the requirements set by one of the Nation's many universities. In and of itself this concept is a fine one, and we have every reason to be proud of it. However, it has had two unhappy consequences: A college degree of some sort, in many cases any sort, has come to be a virtual

prerequisite for many careers and jobs not really requiring one. As a consequence, large numbers of students, seeking the degree rather than the education it symbolizes, have sought out the least demanding curriculums as the simplest means to their end. Many colleges have furthered this trend. The opportunities provided under the GI bill and the continually increasing demands of a growing population, have placed great popular pressure on colleges to enlarge their enrollments during a period when many of them had neither the facilities to care for additional students nor the financial assets to create the facilities. In some instances they have permitted study and awarded degrees in subjects hardly to be dignified as higher education, and in all too many cases the expansion has led to a lowering of academic standards and a dissipation of the educational assets we do possess.

Development of new educational facilities, both human and material, is necessarily a slow process, and the need for qualified graduates is urgent. One obvious but socially painful means of assuring that our presently limited assets are devoted to providing the best training for those students best able to use it, is to apply more stringent admission requirements and to maintain higher required standards of performance from those students accepted.

Insuring a standard of selection and elimination that will be roughly equitable for the Nation as a whole will be difficult, for to deny a student who has graduated from high school the opportunity to continue his education runs against our grain and is certainly not in keeping with our national traditions. It is asking much of citizens that they support State universities into which only a relatively small proportion of their children may gain admission. But I submit that today's conditions may be forcing a course of more stringent selection and limitation upon us, at least until our educational system is vastly expanded, or until we give up the popular delusion that you must have a college degree in order to be a successful businessman.

These, in my view, are the requirements, conditions, if you will, against which specific suggestions for improving our scientific and technical education must be examined: The first is the provision of appropriate financial aid to the secondary school system and to the colleges to enable them to undertake programs of the desired nature and quality. The second is the selection of promising students and the establishment of academic standards which will permit our colleges to make maximum use of the assets they possess.

At the present time the National Science Foundation as well as the Department of Health, Education, and Welfare are examining the various ways in which additional funds can most effectively be used in the education field. There are already operating a number of teacher-training programs and scholarship programs which are proving effective. The planning and organization of these efforts were not carried out on a "crash" basis. They antedate the current popular awareness of the national need. Programs such as the curriculum-improvement program, the teacher-training programs, and the graduate fellowship programs of the National Science Foundation, and the testing guidance and counseling program and scholarship programs which are incorporated in the legislative program to be submitted by the Department of Health, Education, and Welfare, all reflect the considered judgment of experts in the field. It is my view that the most effective support the Congress can presently give to the furtherance of scientific education is to assure that programs such as these receive appropriate financial backing.

How far and how fast these programs can fruitfully be expanded is also a question for the experts, but I am sure that if they are conducted on an objective and professional basis and the two requirements I have mentioned above are faced and met, the Government will be doing all it can properly do to fill the Nation's scientific needs.

Pursuant to the stenographic record of the hearing, as received in this office, I am sending a copy of this letter to Senator Bush.

Respectfully yours,

GARRISON NORTON.

Senator BUSH. I think it is one of the very most important pieces of legislation that we should consider this year, because with the responsibility for education primarily at the town and State level, it is very difficult for the Congress to, you might say, dictate what should be done.

But we do have some leverage in the field nevertheless, and it seems to me we should either hold our leverage or hold out some bait of some kind to schools to broaden and increase the teaching of science at both the elementary and secondary school levels.

Senator JOHNSON. Will the Senator yield there?

Senator BUSH. I will yield for a question.

QUESTION OF COMMITTEE JURISDICTION ON EDUCATION

Senator JOHNSON. I should like to point out we have asked a number of educators led by Professor Conant and others, for suggestions in this field. We will make them a part of the record and perhaps have some testimony before the hearing is concluded on the very point the Senator has been emphasizing although I want to make it abundantly clear that this is not a field over which we have jurisdiction. One of our sister committees headed by Senator Hill will very properly consider that subject, I am sure, when the Congress reconvenes.

We are going to say to Senator Hill and to his committee that they are welcome to participate in any of our deliberations and we are anxious to make available any information that has come to our attention.

We will consider it all, but the purely educational side of this picture is not one over which our committee has jurisdiction.

I ask that this time be taken out of my time and not from Senator Bush.

Senator BUSH. I thank the chairman. I am aware that any bill that would be considered would go to them.

Senator JOHNSON. I wanted to make it clear.

Senator BUSH. The only reason I pursue it is because of the importance laid on it by Doctor Teller, Doctor Bush, and others and they think it is one of the most really important matters in connection with this whole investigation.

Senator JOHNSON. We all do.

Senator BUSH. Yes.

Senator JOHNSON. And we want to hear all the evidence on it that we can.

I commend the Senator; at the same time I do not want my colleagues to feel that maybe we are usurping their jurisdiction. I just put that statement in the record so all will know we are not attempting to take over in this subcommittee any action on the Cordiner report or action on any education bill. I thank the Senator.

Senator BUSH. Well, the Cordiner report has fallen in the Armed Services Committee.

Senator JOHNSON. Well, for the Cordiner report we have a special subcommittee led by the distinguished Senator from Mississippi, Mr. Stennis.

Senator BUSH. That is correct.

Mr. Chairman, I thank you for those remarks, and I am glad that the committee is calling on Dr. Conant for some testimony in this area, and others.

Senator JOHNSON. The staff has already been in touch with him.

Senator BUSH. That is good news.

The other question, Mr. Secretary, I would like to ask you, we had from some of our previous witnesses some very interesting statements

about the command organization, about the Joint Chiefs of Staff, about the Secretary of Defense, and the degree of advice which he gets of a purely military nature and whether it is good enough and so forth and so on.

You perhaps have picked that up from the newspapers and so on.

General Gavin made some remarks here the other night, Friday night, in response to my questions on that subject, and he was rather definite in his view, as I recall it, that the Joint Chiefs of Staff organization was not adequate, that it was a planning organization, basically, and that we should have something more in the nature of the unified command.

It was brought out that General Norstad has it in the NATO organization and we have seen it elsewhere. We have it in the Pacific ourselves, I believe, as an operational matter.

Would you care to comment at this time on the question that I have raised as to whether our whole security organization would be strengthened by revising the Joint Chiefs of Staff or abolishing that setup entirely and establishing a unified command organization as the senior military organization in our setup.

Is that a fair question for you to answer at this time or would you rather not?

I won't press it if you would rather not.

Mr. NORTON. Senator, I am no expert in this field.

Senator BUSH. I raise it with you, Mr. Secretary, because you do have quite a long connection with the Defense Department in one way or another since the Department began, I believe, almost exactly since it began, do you not?

Mr. NORTON. Yes, sir.

Senator BUSH. That is the reason I address it to you, but I won't press it if you are not prepared to answer it.

Mr. NORTON. Senator, I realize that there are deficiencies in our Joint Chiefs of Staff system as we now have it.

I have always been deeply puzzled however, as to what you could do to really improve that situation. I happen to be a strong believer in three separate services.

I personally believe that the people of the United States have received in the past and will receive in the future, better defense from three separate services than they ever would by a single service.

This is a big subject and I could talk about it for a long time, Senator, but that is in general my personal feeling.

However, when it comes to the top staff and whether or not you really could take steps to enable those three services to coordinate their efforts better and to advise the Secretary of Defense better, I have never been clear as to what you really could accomplish.

I read with great care General Gavin's statement to this committee. I have the highest respect for General Gavin. But I frankly was unable to see just what he was proposing and what it really would do to improve the situation.

Senator BUSH. Well, as you say, it is a very, very big subject and General Gavin, like yourself, did not have a chance to expand on it too long the other night, but the reason, 1 reason I raise it again, and will continue to for the consideration of this committee later on, is that here in the missile business we have got all 3 services work-

ing on missiles and I have forgotten how many different types of missiles we have got but it would seem to me from what I have heard in these hearings that we would be probably spending less money and spending it more effectively and getting much more for our dollar if we did not have so many different programs going on and if this whole question of missile development were being done under a unified command and without rivalry between the services in the question of, in this matter of developing missiles.

Mr. Chairman, that concludes my questioning.

I have no other questions.

Senator JOHNSON. Thank you, Senator Bush.

Senator Symington?

Senator SYMINGTON. Mr. Chairman, I have just one or two more questions. You brought up the name of General Gavin, did you not, Mr. Secretary?

Mr. NORTON. Yes, sir.

Senator BUSH. I brought it up.

Mr. NORTON. Senator Bush did. Yes, sir.

Senator SYMINGTON. You are not satisfied with the research and development setup in the Pentagon, did you not so testify previously?

Mr. NORTON. Yes, sir, I testified so.

Senator SYMINGTON. I believe you did say you agreed with Assistant Secretary Gardner about some of those points?

Mr. NORTON. Yes, sir, there are many points made by Secretary Gardner that I agree with heartily.

Senator SYMINGTON. Now General Gavin was talking more on the military side, was he not, when he testified before the committee?

Mr. NORTON. Yes, sir, he was.

Senator SYMINGTON. And his experience in that field may not be comparable to yours in the research and development field but it is more extensive in the military field, is it not?

Mr. NORTON. There is no doubt of the fact, Senator, that General Gavin is far more qualified than I am to comment on this subject. I did not volunteer this comment. I was asked to make it by Senator Bush.

Senator SYMINGTON. I am only trying to make the record.

In other words, General Gavin was talking about something at which he has spent his life.

Mr. NORTON. That is right, Senator.

Senator SYMINGTON. Did you know the parallelism between his comments and those a few years ago of the then General Eisenhower with respect to this subject?

Mr. NORTON. No, sir, I did not know that parallelism.

Senator SYMINGTON. Thank you, Mr. Secretary.

Senator JOHNSON. Senator Barrett, I forget, I had previously called on Senator Symington.

Senator Barrett, do you have any questions?

Senator BARRETT. I have one question, Mr. Chairman, I would like to ask Secretary Norton. I want to bring up the suggestion you made here about the importance of pooling our scientific resources with the enormous reservoir of research talent in Europe.

Mr. Secretary, it seems to me that a good many people agree with you on that, but I have certain misgivings. As I recollect, Dr. Teller

and Dr. Bush both said we might gain more than we would lose by pooling our resources with the scientists in Europe. We have a rather notable record as far as the Manhattan project is concerned, also on the breakthrough in the thermonuclear inventions in 1953.

What bothers me is that since Russia has a much stronger hold on their security over there, we might be disclosing to them those areas where we have excelled without at the same time learning anything about the areas where they have excelled.

What do you have to say about that?

ADVOCATES INTERCHANGE OF INFORMATION

Mr. NORTON. Senator, I see the point that you are making here. There is a danger, of course. There is always a danger when you communicate with anybody as to whether or not he is going to act in good faith.

I would like to point out, however, since you mentioned the Manhattan project, that during the development of nuclear physics, there have been very few American names. By that I mean indigenous American-born scientists, associated with the creative research in nuclear physics.

In 1905 Einstein first announced his famous principle of the relationship of mass and energy. Einstein himself, of course, was European. You look down the list of really creative people—and I am making a distinction there because I don't want you gentlemen to think that I underestimate the contribution of Dr. Earnest Lawrence, for example, who invented the cyclotron, or any other great scientists of this country who have done so much for our defense and for the advance of the science in this country, but I do want to point out that if you look down the list of creative scientists in this field from 1905 to 1945, say, a period of 40 years, you will see names like Rutherford and Bohr and Bethe and Curie and Fermi and Von Neuman and Teller, and Einstein himself.

This has been a subject, Senator, which I have been interested in for a good many years, ever since I began to have misgivings about the development of our foreign policy on what appeared to be a monopoly of one particular weapon missile. And at one point, not being a scientist myself, I asked a number of my friends in the scientific world if they would care to give me a list of the names of people that they thought were really creative in the development of nuclear physics and the mathematics that made it possible.

Now, that list was checked over by a number of my friends. The last one who looked at it was Dr. von Neuman. In his opinion, during this 40-year period there was one American name worthy to be on the list. That was Dr. Michelson, a Nobel prize winner, and the man who proved the speed of light. There are many Russians, many Russians on this list: mathematicians, nuclear physicists. Now, the question arises, and always has in my mind, as to whether or not it is good for the future of the United States to limit the exchange of information in basic research with the great minds of the world, especially when we have to admit, I think, that this country is not notable in that field.

Senator BARRETT. Mr. Secretary, I certainly cannot disagree with you in that respect. The only point I have in mind is this: in this

particular emergency, we do have the benefit of the assistance of all of the scientists of foreign birth that you have mentioned here, and I agree it has been considerable.

But still, at the same time, it seems to me that if we now exchange our knowledge, we gain largely, we will say, from them and give it to these people in Europe; and that perhaps it might infiltrate over into Russia, and Russia would have the benefit of those areas that we have excelled in, while we would not get back the knowledge that Russia has in this field.

From all the testimony before this committee, which is considerable, to say the least, that is my view of the situation.

Mr. NORTON. Senator, it is a chance you take when you communicate with people, there is no doubt about it. It is merely a question of whether you feel that the United States should put a security wall around itself as against the scientists of our friends in Europe, or whether we should not. My vote would be strongly in favor of full communication between our scientists, our basic-research people, and their basic research people.

As a matter of fact, Senator, if there was some way of getting full communication right now between our basic research scientists and the Russian basic research scientists at least in all the fields where the Russians are known to be ahead of us, I would welcome it.

Senator BARRETT. There is no doubt about that. But there is no chance in the world for anything like that to happen. The point I am making is this: By your suggestion, it seems to me, we are saying here that we will make available to Russia all of the knowledge we have in this field, notwithstanding the fact that we are not going to get any information back from Russia about what they are doing.

Is that not about the size of it?

Mr. NORTON. Senator, there is danger always in this sort of a discussion of getting a little confused between basic research and end products of all kinds.

Now, of course, it is true that basic research leads to end products. I would agree that if you happened to have a particular end product and you have reason to feel that this is something rather unique in our possession, you might want to be a little careful about how you talked about it in detail. But what I am discussing here is the limitation of fundamental thinking.

Senator BARRETT. I would agree with you on that. I was confining it to the end product that we are all so vitally interested in at this moment.

Admiral HAYWARD. Senator, I would like to point out one case here that is most important to us that highlights what you say. Here we classified thermonuclear reactions, particularly for power purposes, for some time, and we thought we were quite ahead in various effects. When the Russians paid their official visit to England, Mr. Bulganin and Mr. Khrushchev, they were accompanied by various scientists who gave various papers. One of the first papers they gave was on thermonuclear reaction utilizing the pinch effect. It is a basic thing. The end product, of course, could be the use of this type of device for power. However, we gained by that as much as we would have lost. And I feel, as the Secretary says, it is a risk you take. But in basic research, it has to be done if it is going to be good research.

Senator BARRETT. I quite agree with that. I guess there is no point in our disagreeing with the statement that the European people have excelled in the basic sciences, and they have emphasized it over the years, maybe for hundreds of years.

On the other hand, that is not saying we have not been able, with the help of a good many foreign-born scientists, to make some very worthwhile accomplishments here in this country, and we are going to do so in the future, in my judgment. I do not think we ought to jeopardize our security here in this country by giving away any information that would be of value to Russia. That is my idea about it.

Admiral HAYWARD. Senator, I would be wrong as a naval officer not to say I am proud that Michelson was a lieutenant junior grade, United States Navy.

Senator BARRETT. That is quite right. There are a good many other scientists, too, of whom we can be proud.

Thank you very much, Mr. Chairman.

Senator JOHNSON. I have just 1 or 2 questions I would like to ask, Mr. Secretary, before I pass to my colleagues.

Do you think that in an interchange of scientific knowledge, a free and equal interchange of scientific knowledge with the Russian people, we would learn more from the Russians than they would learn from us?

Mr. NORTON. No, Mr. Chairman, I personally don't feel that. If I did feel that way, I certainly would be very pessimistic as to where we stand today in the broad field of science as against Russia.

I do feel this, though, Senator: that 10 years ago, as I said in my written statement, we could have truthfully claimed that we were ahead of Russia in every major discipline of science. I do not think we can truthfully claim that today.

Senator JOHNSON. How much information on the Russians could we get merely by a large-scale translation of Russian publications?

Mr. NORTON. I think we could get an enormous amount of information, Mr. Chairman.

Senator JOHNSON. At a very small cost?

Mr. NORTON. Yes, sir.

Senator JOHNSON. And you think we have been very derelict in that respect, I gather?

Mr. NORTON. I do; yes, sir.

Senator JOHNSON. Does the security wall shut in or keep out information?

Mr. NORTON. On balance in the field—this is just my personal opinion, Mr. Chairman, of course—in the field of basic research, if you put an airtight wall, I think we might lose more than we gain.

Senator JOHNSON. Your list of distinguished scientists as I gathered it, it began in 1905 and ended in 1945.

Mr. NORTON. Yes, that was roughly it.

Senator JOHNSON. Does that include the Nobel prize winners Lawrence, Anderson, Seaborg, Miller, and Michelson?

Mr. NORTON. It did include Dr. Michelson, sir. He was the only American name on the list that was given to me by a scientist, Dr. Ralph Lapp, who wrote an article on this subject when I was in the State Department. This article interested me very much.

Senator JOHNSON. You are familiar with the fact, are you not, that Lawrence was an American Nobel prize winner?

Mr. NORTON. Indeed I am; yes, sir.

Senator JOHNSON. And did he not have a place on that list?

Mr. NORTON. On the particular list that was given to me at the start, and which I then checked with a number of scientist friends of mine, the name Michelson was the only name that was considered by these scientists to be in the same order of magnitude and the same importance in fundamental research, that is creative research, in the field of nuclear-physics and mathematics.

Senator JOHNSON. But if you are a Nobel prize winner in the field of chemistry or physics, it is not something to be sneezed at, is it?

Mr. NORTON. Indeed no, sir.

Senator JOHNSON. And you are familiar with the fact that Dr. Lawrence is and Dr. Anderson, Seaborg, and Michelson—all are Nobel prize winners?

Mr. NORTON. Yes, sir.

Senator JOHNSON. Senator Saltonstall.

Senator SALTONSTALL. Thank you, Mr. Chairman.

Mr. Norton, I think you testified with great frankness and also with an obvious feeling of having studied this subject for a number of years. Now, this question is in three parts. I have written it out. It is stimulated by some of the questions of my colleagues, notably Senators Johnson and Symington.

Does the Director of Missiles under the directive recently issued by the Secretary of Defense have sufficient authority to get on with the research and development and the operational production stages of missiles? If he has, then is it proper to put the directive into operation? If not, what additional authority should be given the Director of Missiles?

Mr. NORTON. Senator, I am not exactly clear in my mind as to what full authority now rests in the Director of Missiles. As I understand it, there is under consideration now by the Secretary of Defense a proposed special agency.

Senator SALTONSTALL. A proposed what?

Mr. NORTON. I am not at all clear in my mind as to what this special agency is to do and the field it is to cover. I think the matter is still under discussion in the Department of Defense, so that I would say that whatever improvement in centralizing authority for direction of the missile program is going to occur is still a matter of consideration. I do not think that it has been finalized yet, Senator.

Senator SALTONSTALL. The Secretary of Defense certainly indicated that the directive itself was finalized as I sat here and listened to the discussion.

The reason I asked that question is you are the Secretary of Research in the Navy, and as such, you come directly within the terms of this directive, because it would put you under the Director of Missiles, and it could stop you or put you ahead on some other project.

Now, I agree that there was testimony here about the setting up of another agency for space, study of space, but you testified regarding missiles. What I was interested in was whether you were satisfied that the Director of Missiles now had sufficient authority to get on with the job of research and development and operation of missiles.

Mr. NORTON. Senator, this directive to which you refer was issued when I was out of the country, and I have heard that there was a directive, but I have not yet studied it myself. I know in general that a directive was issued giving more authority to the Director of Mis-

siles than he had previously had. But whether or not this additional authority would in my personal opinion be sufficient to enable him to do the job, I don't know as of this moment.

Senator SALTONSTALL. Thank you, Mr. Chairman.

Senator JOHNSON. Thank you very much. Counsel, do you have any further questions?

Mr. WEISL. Yes.

Admiral Hayward, when Secretary Norton read the list of scientists of creative ability and Senator Johnson pointed out the list of great scientists in America who have won Nobel prizes and other honors, I think it is only fair to point out first that you yourself are a scientist and have a degree, a doctors' degree in science.

Admiral HAYWARD. Yes, sir.

Mr. WEISL. And there are many men in the United States Navy who have advanced degrees in science and advanced learning; is that not true?

Admiral HAYWARD. That is correct, sir.

Mr. WEISL. That is all, Mr. Chairman.

Senator JOHNSON. Mr. Secretary, we want to thank you for the contribution you made to the committee's record. We appreciate the language that you spoke this morning. It was the language of candor and you made a real contribution to our work. We hope that the people in the country appreciate the public servants who come here and speak honestly and truthfully, not for the purpose of trying to find some scapegoat but for the purpose of trying to determine what course our country shall follow in order to preserve the state of this Nation's defenses.

We want to commend you for the contributions you have made and thank you for it.

Mr. NORTON. Thank you very much, Mr. Chairman.

REMARKS OF SENATOR JOHNSON

Senator JOHNSON. I would like to make a brief statement at this point. The Chair wants to express its warm gratitude to the dedicated scientists and industrialists who have supplied the committee with a great deal of helpful information. These scientists and industrialists have generally responded to our questions with candor and with thoroughness. We do hope that those who have not yet responded will be able to reply in the very near future. We recognize that all thoughtful Americans want to give very thorough consideration to the problems involved before coming to conclusive judgments.

We do not think that any scientists or any manufacturers are dragging their heels in refusing to give information for fear of possible criticism. We do not want to reach that conclusion. This is a job which requires the contribution of every American who has information, and we hope that all that we have requested to supply will do so at the earliest possible date.

I think it would be proper now for the committee to go into executive session to make some decisions regarding our schedule. And I will say for the benefit of the press who want to accurately report the proceedings that at the conclusion of this executive session the chair will be glad to meet with you very briefly and tell you what, if any, decisions we arrived at. I do not expect the session to take more than 10 minutes.

We will now recess the open meeting until 2:30.

(Whereupon, at 12:40 p. m., the committee resolved itself into executive session.)

AFTERNOON SESSION

Present: Senators Johnson of Texas (chairman) presiding, Kefauver, Stennis, Symington, Bridges, Saltonstall, Flanders, Bush, and Barrett.

Senator JOHNSON. The committee will come to order.

Our next witness is Rear Adm. Charles E. Weakley, director of the Undersea Warfare Division of the Office of the Chief of Naval Operations.

From the information which has been presented to the committee thus far, it is evident that Admiral Weakley's branch of the service is one of tremendous importance in regard to the current situation. The committee is looking forward with great interest to your testimony, Admiral.

Will you please come forward, raise your right hand and take the oath?

Do you solemnly swear the testimony you give this committee will be the truth and the whole truth?

Admiral WEAKLEY. I do.

Senator JOHNSON. Have a seat, Admiral.

Do you have a prepared statement, sir?

Admiral WEAKLEY. I do, sir.

(The biographical statement of Admiral Weakley is as follows:)

Admiral Weakley is Director of the Undersea Warfare Division in the Office of the Chief of Naval Operations.

He was born in St. Joseph, Mo., on June 11, 1906. He was graduated from the United States Naval Academy on June 6, 1929.

In June 1929, he was assigned to the U. S. S. *Omaha*. He then had successive service in the U. S. S. *Lea* and U. S. S. *Talbot*, with duty as an engineer officer until June 1936. For 2 years he was a student at the University of Cambridge, Cambridge, England, studying general engineering.

In July 1939, he reported to the U. S. S. *New Mexico* as electrical officer until May 1940 when he was ordered to the U. S. S. *Sampson*, first as her chief engineer, later as executive officer. In September 1942, he assumed command of the U. S. S. *Goff*.

On March 26, 1944, he reported for duty as commander, Antisubmarine Warfare Unit, Naval Operating Base, Norfolk, Va., and later was assigned to the staff of commander, Fleet Operational Training Command, Atlantic Fleet.

From November 1945 until August 1948 he was attached to the Office of the Chief of Naval Operations, Navy Department, Washington, D. C., and during the 2 years to follow he was commanding officer of the Surface Antisubmarine Development Detachment, Atlantic, with headquarters at Key West, Fla.

After graduation in June 1951 from the National War College he returned to the Office of the Chief of Naval Operations as naval adviser, National Security Council Staff, International Affairs Division.

He assumed command on December 5, 1953, of the U. S. S. *Cambria* (APA 36). From September 26, 1954, to October 6, 1955, he commanded the U. S. S. *Northampton* (CLCI). On October 31, 1955, Admiral Weakley assumed duty as Assistant Chief of Naval Personnel for Naval Reserve, and in December 1956 was assigned additional duty in the Office of the Chief of Naval Operations.

In April 1957 he was ordered relieved of his primary duty, but continued duty in the Office of the Chief of Naval Operations, and since September of that year has been Director of the Undersea Warfare Division.

Admiral Weakley has received the Legion of Merit with Combat V, the Bronze Star Medal, and other decorations.

Senator JOHNSON. Will you proceed with the statement, please.

**TESTIMONY OF REAR ADM. CHARLES E. WEAKLEY, DIRECTOR,
UNDERSEA WARFARE DIVISION, OFFICE OF CHIEF OF NAVAL
OPERATIONS**

Admiral WEAKLEY. Gentlemen, the seriousness and the magnitude of the antisubmarine warfare problem have already been indicated to you by the Secretary of the Navy and the Chief of Naval Operations.

Before submitting myself to questions I should like to address myself briefly to the principal parts of the overall antisubmarine problem as we see it. By that I mean the main things that are involved in the very difficult complicated business of detecting and destroying submarines in any numbers.

Or, to put it in another way, to keep them from carrying out either major mission described by the Chief of Naval Operations, Admiral Burke, to you gentlemen.

Our antisubmarine effort in terms of current forces, techniques, and equipment is directed to prevent our lines of sea communication from disruption by a submarine enemy, and to prevent crippling surprise missile attack from submarines upon targets in the continental United States.

The current forces involved in our present effort include almost the whole of our Navy.

These forces are commanded and linked together by rapid communications. They are capable of reacting quickly and effectively and with full benefit of the latest operational intelligence. Our concept of antisubmarine warfare is basically a team concept designed to employ each member of the complex team in its strongest role when placed against submarines.

ANTISUBMARINE ALERT ON 24-HOUR DUTY

Our forces are conducting exercises and evaluations to perfect this teamwork of ships, aircraft, and our own submarines to a degree which has never been possible before.

Our communications, our command structure, our schools make this possible. The sheer number of submarines in possible enemy hands makes this imperative. These forces are available to track any submarine detected and are armed to destroy it if so directed. We have aircraft and ships on an alert status ready to investigate any submarine when ordered. This is a 24-hour a day duty.

Our research and development effort is moving ahead in order to improve our capability to destroy submarines.

Advancements in this field involve detection, classification, pinpointing the location of our submarine enemy, and the weaponry and other elements for the kill.

We are making substantial progress in the general areas of atomic weapons for antisubmarine warfare, more sophisticated and more effective torpedoes.

We are reaching to give our forces longer range weapons which let them strike at the submarine as soon as it can be detected.

Today's enemy would find himself faced directly for the first time in history by submarines which have been designed and are able, to seek him out in the ocean depths and destroy him.

He will discover that the helicopter has been added as a versatile member of the searching and attacking team. When he finds our convoys or our operating forces he will face search and attack forces of destroyers, escorts, and aircraft working together with weapons not hitherto employed in anger.

Our newly developed mines will be effective in containing submarines in their ports, in preventing the return of those already sailed, and in blocking sea exits.

Our fast carrier attack groups will be effective in striking at the source of his sustained endeavor.

As Admiral Burke has indicated, gentlemen, this is attrition warfare. We expect the attack carriers to help in depriving the submarine enemy of building facilities; to attack submarines in port, to destroy mobile support groups and the complex of sustaining and supporting measures necessary to his continued submarine operation. The attack aircraft can greatly assist, too, in the mine-laying effort. In these capacities we consider our attack aircraft carriers with their high-performance aircraft as full-fledged members of our antisubmarine team.

The threat to the sea communications, which are absolutely vital to project our power outward to the shores of our allied and to the maritime frontiers of any enemy—this threat could be just as real in limited wars as in general war.

The threat is without parallel in the peacetime history of the world. The Soviets possess the largest submarine fleet that has ever been possessed by any world power, as indicated by the Chief of Naval Operations, in peacetime.

Gentlemen, this is true, as well, in war.

In order to enhance our ability to cope with submarines of markedly advancing capabilities, we must solve many problems. We have been assisted immeasurably by such scientific organizations as the Committee on Undersea Warfare of the National Academy of Sciences, and by groups of dedicated scientists, educators, and industrialists which they have sponsored. Many of our technical advances, for that matter, have been the result of \$1 contracts with industrial firms and private laboratories.

Many have resulted from simple conversations with patriotic scientists.

In bearing the responsibility which I have in this matter I can assure you of the urgency with which the Navy is attacking the problems of antisubmarine warfare.

In short, given the continuity of support, the Navy will assure the continuity of effort in this matter. We consider this the most critical problem we face today.

Gentlemen, I thank you for the opportunity to make these remarks and I am ready for such questions as you may wish to put to me.

Senator JOHNSON. How many helicopters do you have employed in antisubmarine warfare?

Admiral WEAKLEY. I would rather not speak to the total number, Senator. We have—

Senator JOHNSON. Is that secret?

Admiral WEAKLEY. Shall I say over a hundred?

I will be glad to give you the exact figure in later sessions.

Senator JOHNSON. How modern are they?

Admiral WEAKLEY. These helicopters have been instrumented, insofar as the art would permit, to improve their blind flying and non-contact flying capability.

The next batch which we will get will be so instrumented.

Today's helicopter suffers deficiencies at night, in heavy fog, and in heavy weather. Tomorrow's we hope will take care of that.

Senator JOHNSON. Are the ones you have now modern?

Admiral WEAKLEY. What we have now is modern; yes, sir.

Senator JOHNSON. How many miles an hour do they fly?

Admiral WEAKLEY. Since I am under oath, Senator, I wish it understood that this is an estimate. About 100 miles an hour in horizontal flight.

Senator JOHNSON. Counsel, will you proceed?

Mr. WEISL. Admiral Weakley, within the bounds of security, can you tell the committee the capability and strength of the Russian submarine fleet?

Admiral WEAKLEY. Within broad limits the strength runs to about 475. I believe that is the accepted figure, some 300 of which are of post-World War II construction.

Mr. WEISL. From what sources does your information come?

Admiral WEAKLEY. From all sources which are available to us, Mr. Weisl.

Mr. WEISL. Including intelligence sources?

Admiral WEAKLEY. Of course, sir.

Mr. WEISL. How does this strength of the Russian submarine fleet compare with the submarine fleet that the Germans had at the beginning of World War II?

Admiral WEAKLEY. At the beginning of World War II, the Germans had about 58 operational submarines, of which 29 were of longer range, seagoing type. At the top of the war, the number of operational submarines in German hands at any one time was 460.

Mr. WEISL. In other words, at the beginning of the war, the German submarine fleet was about one-ninth the strength of the present Russian submarine fleet, as far as you know?

Admiral WEAKLEY. That is correct, sir.

Mr. WEISL. How serious do you consider the threat of the Russian submarine?

RUSSIAN SUB THREAT IS UNPARALLELED

Admiral WEAKLEY. As I remarked in my statement, sir, I believe this threat to be unparalleled.

Mr. WEISL. What steps are you taking to meet this threat, insofar as you can tell them to us without in any way violating security regulations?

Admiral WEAKLEY. We are attempting to look ahead, to pace our program and so time it that we are in a reasonable position by the time our forces have to face the submarine improvements which we now see in store. The Chief of Naval Operations has given emphasis to this matter. He has told me that the Navy has no more important program than this one.

Mr. WEISL. How critical is the time element to meet this threat?

Admiral WEAKLEY. The time element is quite critical, as I view it. You will recognize that in antisubmarine warfare we are dealing with something the timing of which is in an enemy's hands. It is

incumbent upon us that we be prepared to meet the threat that he can furnish at the time he is capable of furnishing it.

Mr. WEISL. Are you getting the proper funding, the proper assistance to meet this critical demand?

Admiral WEAKLEY. I have been in my present position a little over 3 months. The atmosphere in which I arrived, and which I have met while here, has been one of augmentation and constantly increasing urgency.

Mr. WEISL. Is it of sufficient urgency—

Senator JOHNSON. Let me ask a question, Counsel.

Did you respond to the counsel's question?

Repeat your question, please.

Mr. WEISL. My question was whether you are at the present time receiving sufficient funding, sufficient assistance, sufficient acceleration to meet the critical time element that is necessary to protect the national security against submarines.

Senator JOHNSON. Speak on funding first, and then we will get to the other things later.

Admiral WEAKLEY. With respect to funding, I would say not to my complete satisfaction. With respect to—

Senator JOHNSON. In what respect? Let's go into a little detail. Why isn't it to your complete satisfaction?

Admiral WEAKLEY. I must speak in terms of numbers, Senator Johnson.

You recognize that in antisubmarine warfare, other than in the question of strikes at the source of the enemy's effort, we face an area problem once our submarine is at sea. Our ranges of detection are limited, compared to the size of that area. We face a problem in which, in the present state of the art, we need numbers, numbers of units.

Mr. WEISL. Are you getting a sufficient number of units?

Admiral WEAKLEY. I am pressing for sufficient numbers, Mr. Weisl. Within the period of my 3 months' experience, you don't build many ships in that length of time.

Mr. WEISL. Is the program being developed sufficiently accelerated or being accelerated to meet the necessary demands?

Admiral WEAKLEY. The program, I believe, is, with the present emphasis which is being placed upon it.

Mr. WEISL. Is there sufficient emphasis being placed upon it?

Admiral WEAKLEY. Since this is my responsibility, I must say that sufficient emphasis—I will never be completely happy until everyone in the United States is putting emphasis on this problem.

Mr. WEISL. What steps are you taking, or is the Navy taking, to see that everyone in the United States is exerting sufficient influence on this problem?

Admiral WEAKLEY. We, of course, are working through the members of the Committee on Undersea Warfare.

We have recently held a meeting of the NSIA here in Washington, at which we apprised them of our problems in undersea warfare, and elicited the interest of the industrial laboratories. You will recognize that the commercial people are not, within their own lines of competition, engaged nor interested in sinking submarines. This is a matter of patriotic interest rather than something they get into commercially.

Mr. WEISL. What is this Committee on Undersea Warfare?

Admiral WEAKLEY. The Committee on Undersea Warfare is a committee which was established through the Office of Naval Research in 1946. The purpose of its original establishment was to gain for the antisubmarine people a group of scientists such as we had working with us in division 6 of the NDRC during World War II.

Mr. WEISL. Is that a permanent committee or temporary committee?

Admiral WEAKLEY. This is a permanent committee.

Mr. WEISL. Appointed by whom?

Admiral WEAKLEY. It was selected by consultation between the Chief of Naval Research and the scientists concerned. These scientists are not hired, in the strict sense of the word. The Navy contract pays for their clerical services. It pays for travel. The scientists, themselves, have refused all offers of any remuneration.

A similar committee, more recently formed under the auspices of the National Academy of Sciences, is the Mine Advisory Committee which considers and advises us relative to sea mines and mine countermeasures. This committee is similarly contracted, and its members serve without pay.

There is an additional high-level committee which is a statutory committee funded by the National Academy of Sciences. It is the Naval Research Advisory Committee, which advises in the broad areas affecting any and all forms of naval warfare. All of these committees have been most helpful.

Mr. WEISL. Are there any other committees involved in giving advice on antisubmarine warfare?

Admiral WEAKLEY. Mr. Weisl, we in the Navy work on the task-force system. We frequently set up committees, around a particular problem, of experts who know something about it.

There are innumerable committees.

Mr. WEISL. How many committees would you say?

Admiral WEAKLEY. Well, in the antisubmarine conference alone, there are, allowed for, eight committees. We only have one of those active at this moment.

Mr. WEISL. And under whom do those committees operate?

Admiral WEAKLEY. Those particular committees operate under me.

Mr. WEISL. How often are they available for consultation?

Admiral WEAKLEY. They are available on call for consultation.

Mr. WEISL. Admiral, what major advances in antisubmarine warfare have been made?

Admiral WEAKLEY. I speak to the time-period since World War II in order to limit the area.

Mr. WEISL. Yes.

Admiral WEAKLEY. We have increased our ranges of detection by orders of magnitude.

This, of course, does not give us an enormous range today, even so.

The major advances include the field of weapons, the field of communications, command structure, rapidity of transfer of information from one to another.

The basic elements of how best to key together the various units in the Navy which do have proficiency in antisubmarine warfare, in

order to lever with the strength of each and to supplement the weakness of one with the strength of the other.

Beyond that, I would prefer not to get into too much detail here.

Mr. WEISL. I believe, Admiral, that Admiral Burke testified somewhat on the Russian capability and propensity for mining, and that her capability in that respect is a very serious threat to both ends of our sea lines of communication.

Do you agree with that?

Admiral WEAKLEY. I do, sir.

Mr. WEISL. Would you care to say anything further about that?

Admiral WEAKLEY. I would simply say that it is well known that the Russians have mine tracks on every surface ship that they have built.

They have a mine-laying capability in every submarine that have built. Obviously, they can use mines and will if it so serves them.

Mr. WEISL. What steps are you taking to meet this threat?

Admiral WEAKLEY. I have within my division the Mine and Mine Countermeasures Section. We are very alert to our problems, and we are working hard at them, and we have recently established the Mine Countermeasures Laboratory in Panama City to work exclusively on mining and mine countermeasures.

Mr. WEISL. Admiral Weakley, will you please tell the committee what help you really need to meet your responsibility, which is great and grave?

Admiral WEAKLEY. I need the help of every citizen of the United States in terms of his understanding of our problem, his willingness to give us the continuity of support in our efforts to solve it.

Mr. WEISL. Can you be a little more specific as to what this committee can do to help? We cannot get in touch with every citizen of the United States, as you well know, Admiral. What can this committee do to help?

Admiral WEAKLEY. We need units in adequate numbers, and here I speak to those units which comprise the whole of the gamut of vehicles which take part in antisubmarine warfare. I speak to submarines. I speak to destroyers. I speak to the mine countermeasure ships in particular. I speak to aircraft, helicopters, blimps, carriers.

Mr. WEISL. Could you be a little more specific, Admiral, and put first things first, if you can? I know it is difficult. What can Congress do, what can this committee do, to help you in this tremendous task that you face to protect this country against submarine attack?

Admiral WEAKLEY. Congress can assist in the main by understanding our problem.

Mr. WEISL. They do understand the problem, I am sure, Admiral Weakley, but specifically what would you recommend? Suppose you were in their place and the committee wanted to help you meet this problem insofar as it could. They are willing to do anything to arouse the Nation.

That is what this hearing, I think, is hopeful of doing.

But what can the committee recommend be done? I know it is a difficult question to answer, Admiral, but we would like to be helpful. You impressed us with the tremendous threat which we face and the problem you have in meeting it.

CONGRESS MUST ASSURE FUNDING

Admiral WEAKLEY. I feel that the Congress, by assuring us of the funding, can do more for us than they can in any other way.

Mr. WEISL. Have you a program to recommend and present to the Congress, looking toward that end?

Admiral WEAKLEY. At this time and at this meeting, I do not have a detailed and specific program.

Mr. WEISL. Can you have prepared for the committee a memorandum listing, in order of importance, the recommendations that this committee can have from you so that they can make a report to help you meet this threat that you face?

Admiral WEAKLEY. I can do that for executive use, not in the open hearings. You have had such a listing from Admiral Burke in general terms.

Mr. WEISL. Yes. Will you give us a memorandum——

Admiral WEAKLEY. I can, sir.

Mr. WEISL. We will not use in open hearing?

Admiral WEAKLEY. I can, sir.

Mr. WEISL. Thank you, sir.

I don't believe I have any further questions, Mr. Chairman.

Senator JOHNSON. Admiral, do you need any more men?

Admiral WEAKLEY. We can use more men.

Senator JOHNSON. I am not asking you how many you can use. Everybody can use more. Do you need any more?

Admiral WEAKLEY. We are short on personnel, sir.

Senator JOHNSON. Do you need any more money?

Admiral WEAKLEY. Yes, sir.

Senator JOHNSON. And you are not going to hesitate to tell your budget people, through your proper lines of command, how much you need to make this Nation as secure as you think it ought to be?

Admiral WEAKLEY. That is correct, sir.

Senator JOHNSON. So you need money and you need men.

Admiral WEAKLEY. I need money and men.

Senator JOHNSON. Do you need any legislation that you know about?

Admiral WEAKLEY. Not that I know of, sir.

Senator JOHNSON. Admiral, do you feel we are ahead or behind the Soviet Union in our preparation for submarine warfare?

Admiral WEAKLEY. I feel we are ahead of them in the technique which we employ. I take it you mean the antisubmarine ahead of the prosubmarine. We are ahead of them in terms of our techniques. We have the techniques, the capabilities to handle the problem, provided we are given sufficient numbers.

We face this threat with what I would describe as a small but very versatile and capable force.

Senator JOHNSON. So you have the know-how, and you need the dollars and the men to back it up; is that what you are saying?

Admiral WEAKLEY. That is correct, sir.

Senator JOHNSON. You are going to tell us in a private memorandum why you are not satisfied with the funding?

Admiral WEAKLEY. I will be glad to, sir.

Senator JOHNSON. Would you tell us what you think our capability for detecting Soviet submarines operating in waters with 500 miles of our coasts may be?

Admiral WEAKLEY. I would rather not approach that in open session.

Senator JOHNSON. Thank you very much.

Senator BRIDGES?

Senator BRIDGES. Admiral, you said the Soviet submarine threat is without parallel in the peacetime history of the world. The Soviets possess the largest submarine fleet that has ever been possessed by any world power. In your answer to the question by counsel, you said they had 475 submarines.

We have heard from various sources different figures on the number of Russian submarines. The number differs from the number which you have given us. I would assume you are as good an authority as anyone on the subject.

How do you explain the difference, when some say that they have 600 submarines, while others say 500 to 600? Is that explained by the fact that you are talking about modern submarines, and the total number is an accumulation of both obsolete and modern submarines?

Admiral WEAKLEY. I speak to operating submarines, first, Mr. Senator.

In the second place, since I am speaking in public, I speak in approximate terms.

Senator BRIDGES. I understand then there would be no conflict generally?

Admiral WEAKLEY. Some 475 would be the figure I would give you for talking purposes.

Senator BRIDGES. Of operating submarines?

Admiral WEAKLEY. That is correct, sir.

Senator BRIDGES. And you have no quarrel with a figure that has been used of 500 to 600?

Admiral WEAKLEY. I believe 600 is a little high. I wouldn't argue over 500; no, sir.

Senator BRIDGES. Do the Russians have a nuclear-powered submarine?

Admiral WEAKLEY. They have given us no evidence that they have such a thing. We assume from their powerplant developments, and that type of thing, that they have the capability to build them; and of all the things which we will not do, one of them is, we will not underrate our enemy.

I would not expect the Soviets to tell us they have a nuclear submarine until somehow they have more of them than we have. There is no profit in being second best.

Senator BRIDGES. But for the moment——

Admiral WEAKLEY. We must allow for.

Senator BRIDGES (continuing). In this country we know we have nuclear-powered submarines and we have no knowledge that the Russians have——

Admiral WEAKLEY. That is correct, sir.

Senator BRIDGES (continuing). A nuclear-powered submarine.

Admiral WEAKLEY. That is right, sir.

Senator BRIDGES. So that is one gold star for us, is it not?

Admiral WEAKLEY. We hope so, sir.

Senator BRIDGES. Do you know whether the Russians have equipped their submarines with guided missiles?

Admiral WEAKLEY. They have not indicated to us that they have, with the sole exception of an article which I think appeared in their Red Fleet magazine, and in which they announced to their fleet that they now had missiles in submarines.

Senator BRIDGES. But from other sources than that, have you heard that they have them so equipped?

Admiral WEAKLEY. We have no other concrete information which indicates that they have missiles in their submarines.

Senator BRIDGES. And you would have the latest information on that, would you not?

Admiral WEAKLEY. I would, sir.

Senator BRIDGES. Would you be surprised if this committee had been told otherwise?

Admiral WEAKLEY. No, sir; I would not.

Senator JOHNSON. By responsible Government people.

Admiral WEAKLEY. Speaking in public, sir?

Senator BRIDGES. No; not necessarily. I am just trying to get at the facts. You said that the threat is without parallel in the peacetime history of the world. Do you think the threat of guided missiles from submarines is a greater threat than intercontinental missiles, or an equal threat with intercontinental missiles, or a lesser threat than intercontinental missiles?

Admiral WEAKLEY. You have me a little out of my field when you talk in the area of the destruction which can be achieved by missiles, you recognize, sir.

Within the limits of my competence, I consider an intermediate-range missile mounted in a ship as the rough equivalent of an intercontinental missile.

Senator BRIDGES. In other words, what you are saying is that if they have missiles with a substantial range which can be fired from submarines or from ships, the damage to the continental United States, for instance, could be as great as the damage caused by intercontinental ballistic missiles?

Admiral WEAKLEY. Provided they have them in sufficient numbers and range; yes, sir.

Senator BRIDGES. Thank you.

Admiral WEAKLEY. You recognize this is not a question on which I am the expert.

Senator BRIDGES. Certainly. But it is your job to protect and defend the country against submarine attack, so you, would be, in my opinion, recognized as an authority.

Admiral WEAKLEY. All right.

Senator JOHNSON. Senator Kefauver.

Senator KEFAUVER. Thank you, Mr. Chairman.

Admiral WEAKLEY, state again your official position.

Admiral WEAKLEY. I am the Director of the Undersea Warfare Division of the Office of the Chief of Naval Operations, Senator Kefauver.

Senator KEFAUVER. Well then, you are director of the entire submarine program; is that it?

Admiral WEAKLEY. I carry the Chief of Naval Operations' responsibilities insofar as he can delegate them for the submarine program; yes, sir.

Senator KEFAUVER. Not only defensively but offensively?

Admiral WEAKLEY. That is correct, sir.

Senator KEFAUVER. And in your line of communication, you report directly to Admiral Burke, the Chief of Naval Operations?

Admiral WEAKLEY. I report to the Deputy Chief of Naval Operations for Operations and Research and Development; Vice Admiral Combs is my immediate superior.

Senator KEFAUVER. Vice Admiral Combs. He is the Deputy Chief of Naval Operations?

Admiral WEAKLEY. That is correct, sir.

Senator KEFAUVER. I was interested, sir, in your intelligence. I do not mean your I. Q.; I know your I. Q. is good. But the information you get about the problem you have to meet. You have your own naval intelligence. Is that was you rely upon?

Admiral WEAKLEY. Naval intelligence, of course, is the chief source of our detailed information. We do, however, profit from sightings made by passing aircraft pilots. We are keyed in with various flights which the Air Force makes. We utilize all the sources we can, Senator Kefauver.

You gentlemen might like to look at a few pictures here.

Senator KEFAUVER. Well, sir, is there some coordination with your intelligence and the Central Intelligence Agency, under Mr. Dulles?

Admiral WEAKLEY. Under the law there is that coordination; yes, sir.

Senator KEFAUVER. I am not talking about under the law. Is there in fact?

Admiral WEAKLEY. There is from my viewpoint, in fact. I would suggest, however, that the intelligence people are the most competent to speak directly to that point, sir. From where I sit and in my view, there is good coordination between our intelligence agencies.

DIFFERENCES IN STATEMENTS ON SOVIET CAPABILITIES

Senator KEFAUVER. I just say, without going into detail, there seems to be some difference in information that you have and other information as to some points in your testimony of the Soviet capabilities. I assume if there is any deficiency in this coordination of intelligence, something will be done about it.

You mentioned the need for more money. What did your operations get during this fiscal year?

Admiral WEAKLEY. You will recognize I do not have these detailed figures. I will get them, sir.

Senator KEFAUVER. Will someone else testify about that?

Admiral HAYWARD. Yes, sir. I have been sworn.

Senator JOHNSON. You have been sworn. Go ahead, Admiral Hayward.

Admiral HAYWARD. The total of ASW is what you wanted, Senator?

Senator KEFAUVER. I just wanted Admiral Weakley's operation, submarine data.

Admiral WEAKLEY. This is the sort of thing which is very difficult to break down. For example, Senator Kefauver, as I indicated, our carrier striking forces can be critical in an attrition warfare of this kind. How much of them do I charge, for example, to antisubmarine warfare? They would be the key pieces in the offensive mine laying. How much, then, of their cost do I charge to antisubmarine warfare? Something between 50 and 75 percent of the total naval budget in our present situation in which the major threat does seem to come from the Soviet submarine, I would say, is chargeable.

Admiral HAYWARD. Actually it is 61.8 percent, Senator, and in the anti business, it is 21.4 percent of that.

Senator KEFAUVER. Of the total allowed?

Admiral HAYWARD. Of the total Navy budget.

Senator KEFAUVER. For submarines?

Admiral HAYWARD. No, no, sir. This covers detection, classification, recognition, destruction, general antisubmarine projects, anti-submarine aircraft, night detection, countermeasures, nuclear weapons, offensive antisubmarine, acoustical detection, sonar detection. It covers the whole gamut really.

Senator KEFAUVER. It is not broken down in that fine detail, but it is presented to the Appropriations Committees of Congress.

Admiral HAYWARD. No, sir. Any research and development for the Navy really does go across the board. For instance, any advances you make in electronics such as the Maser or something of this nature would go for missiles, antimissiles, for aircraft, so it is pretty hard to pin it on one particular program.

Senator KEFAUVER. Did you get cut down this year in your request by the Bureau of the Budget?

Admiral HAYWARD. Yes, sir.

Senator KEFAUVER. Or by the Congress?

Admiral HAYWARD. I cannot speak for the Congress, sir. And as far as the Bureau of the Budget, yes, sir; any reduction in research and development would reduce the effort across the board.

Senator KEFAUVER. Did you get reduced this fiscal year by the Bureau of the Budget?

Admiral HAYWARD. Well, by the same terms that Secretary Norton said in that the overall budget of the Navy was a static figure, and in weighing the responsibilities or readiness, research and development took its normal, let me say, cut on it; yes, sir.

Senator JOHNSON. What the Senator wants to know is that you asked for more money and instead you were cut; that is correct, isn't it?

Admiral HAYWARD. That is correct; yes, sir.

Senator KEFAUVER. Will you tell us in round numbers or approximately how much you asked for and how much you think you will need?

Admiral HAYWARD. Well, I would rather leave it to the statement that Admiral Weakley is going to make on what he thinks are deficiencies in the submarine, antisubmarine, Senator Kefauver.

Senator KEFAUVER. Very well, thank you, Mr. Chairman. Are you going to make that statement or have you already made it, Admiral?

Senator JOHNSON. You are going to supply it for the record.

Senator SALTONSTALL.

Senator SALTONSTALL. I have no present questions.

Senator JOHNSON. Senator Symington. Senator Stennis. Senator Bush.

Senator BUSH. No, sir.

Senator JOHNSON. Senator Barrett.

Senator BARRETT. No questions.

Senator JOHNSON. Thank you very much, Admiral. You have made a very impressive witness and we appreciate your contribution a great deal. We hope you will go home now and spend a lot of time on preparing that memorandum for us and let us know how many men you really need, how much money you really need and what you think that this Congress can do to be helpful in the way of legislation, if anything.

(The material requested was furnished the subcommittee. It contained classified data and has been placed in the executive session testimony.)

Admiral WEAKLEY. Thank you very much, gentlemen. The pictures that you were handed are not classified. They are yours to do with what you like.

Senator JOHNSON. We got a good look at them last week and they were classified and I want to congratulate you on declassifying them. I am corrected.

Admiral Clark is our next witness. Do you solemnly swear the testimony you will give this committee will be the truth and nothing but the truth?

Admiral CLARK. I do.

(The biography of Admiral Clark is as follows:)

REAR ADM. JOHN E. CLARK

Admiral Clark is Director of the Guided Missiles Division in the Office of Chief of Naval Operations.

He was born near Atchison, Kans., on August 1, 1905. He graduated from the United States Naval Academy and was commissioned ensign on June 2, 1927.

He served on board the U. S. S. *Milwaukee*, and the U. S. S. *Pittsburgh* from 1927 to 1931. After flight training at the Naval Air Station, Pensacola, Fla., he was designated naval aviator on September 28, 1932. The next month he joined Fighting Squadron 3B, attached to the U. S. S. *Langley*.

Between 1935 and 1937 he was assigned to the Naval Air Station, Norfolk, Va. In June 1938, he joined Torpedo Squadron 3 on the U. S. S. *Saratoga*. On June 10, 1941, he assumed command of that squadron, continuing to command it, until April 1942. He next served as gunnery officer on the staff of commander, Carrier Division 1, U. S. S. *Lexington*, flagship. In August 1942 he reported as gunnery officer on the staff of the commander, Air Force, United States Pacific Fleet.

From July 1943 until January 1945 he was assigned at the Naval Air Station, Patuxent River, Md., followed by successive instruction at many high-level military war colleges and schools. In July 1945 he reported as aviation officer on the staff of the commander, Philippine Sea Frontier, and 4 months later assumed command of the U. S. S. *Currituck*. In July 1947 he reported as Chief of the Air Objectives Station, Office of the Deputy Chief of Naval Operations (Air). He remained there until August 1949 and following instruction which lasted until June 1950 at the Industrial College of the Armed Forces, Washington, D. C., joined the staff of the commander in chief, United States Pacific Fleet. He had duty in connection with guided missiles in the Office of the Secretary of Defense, Washington, D. C., from April 1952 until July 1953, when he assumed command of the U. S. S. *Wright*. Detached from command of that aircraft carrier in September 1954, he returned to the United States, and in October became commander, Navy Guided Missile Test Center, Point Mugu, Calif. On November 18, 1955, he was assigned duty as Director of the Guided Missiles Division, Office of the Chief of Naval Operations, Navy Department.

Admiral Clark has received the Legion of Merit, the Commendation Ribbon, and other military decorations.

**TESTIMONY OF REAR ADM. J. E. CLARK, UNITED STATES NAVY,
DIRECTOR, GUIDED MISSILES DIVISION, OFFICE OF CHIEF OF
NAVAL OPERATIONS**

Senator JOHNSON. Our next witness is Rear Adm. J. E. Clark, Director of Guided Missiles in the Office of Chief of Naval Operations. Admiral Clark, the committee on the basis of the testimony it has received so far has been quite impressed with the planning of the Navy in the missile field. We are glad to welcome you here, and if you have a prepared statement, will you proceed with it, at the conclusion of which the counsel will examine you.

Proceed, Admiral Clark.

Admiral CLARK. I have a very brief statement, Mr. Chairman.

In support of its objectives, the Navy has embarked on an extensive missile program. Historically, this program started during the latter days of World War II and was aimed at developing the surface-to-air missile to counter the kamikaze and an air-to-surface missile to attack shipping.

Today, because of the multiple missions of the Navy and its versatility, we must be in the missile business across-the-board so to speak, that is, in contrast to the other services we have requirements for missiles in all categories.

The special problems faced by the Navy in developing guided missiles for the fleet have resulted in charges of duplication in programs. We have made every effort in the past to avoid duplication by careful and continuing survey during the early development phase and, as a result, in the last 8 years the Navy has eliminated 11 guided missile projects in their early stages. We have apparent duplication in those cases where missiles are under development to replace existing missiles and both, of course, are intended for the same mission. Obviously, one cannot wait until a weapon has exhausted its usefulness before starting to develop its successor.

Navy missile systems must function in very special environments. This means that our missiles must be especially designed. The shape of a guided missile, and the production engineering that is built into it, is determined more by the requirements of its prelaunch environment than its mission.

We are in a transition period, one of those trying periods when there is an urgency to employ the new, while at the same time, the old must be phased out slowly in order that we may at all times be ready for war. The Navy now has four guided missiles in the operating forces, albeit in limited numbers, and not one of the units employing them is an experimental unit. The aircraft squadrons, ships, and submarines presently with missiles are part of the operating forces and ready for use now.

Furthermore, the missiles are being prepared, checked out, and fired by sailors and naval officers without help from highly qualified civilian technicians. This transition period is a continuing one and for some time to come we will have to face the unpleasant prospect of an expensive procurement program to maintain current readiness while at the same time we embark upon an expensive development program to assure future readiness.

Senator JOHNSON. Admiral, you are the Director of the Guided Missiles Division of the Navy; is that correct?

Admiral CLARK. The Guided Missile Division in the Office of the Chief of Naval Operations, yes, Mr. Chairman.

Senator JOHNSON. Counsel.

Mr. WEISL. Admiral Clark, how long have you been the Director of the guided missiles program?

Admiral CLARK. Two years, sir.

Mr. WEISL. And what did you do before that?

Admiral CLARK. Prior to that I was the commander of the Navy's Guided Missile Evaluation Center at Point Mugu. Prior to that I had duty on a carrier. Prior to that I was on the staff of Mr. K. T. Keller, Director of Guided Missiles in the Department of Defense. And prior to that I had a 3-year tour of duty in the Guided Missiles Division as a younger officer.

Mr. WEISL. What is the present capability of the Navy in guided missiles?

Admiral CLARK. Mr. Weisl, as I said, we are in this business in all categories. We have 13 projects at the moment; we have 4 missiles actually in service; we have 2 air-to-air.

Mr. WEISL. If you do not mind, Admiral, what missiles have you in service now?

Admiral CLARK. We have 4 missiles in service, Mr. Weisl: 2 air-to-air missiles; 1 antiaircraft missile, that is a surface-to-air missile; and 1 surface-to-surface missile, the Regulus I. Others are coming along very rapidly.

REGULUS I IS ONLY SURFACE-TO-SURFACE MISSILE

Mr. WEISL. So the only surface-to-surface missile that you have that can be launched from a vessel is the Regulus I?

Admiral CLARK. That is correct at the moment.

Mr. WEISL. Is that an air-breathing missile?

Admiral CLARK. Yes, sir.

Mr. WEISL. I presume that to discuss its range would not be in the national interest.

Admiral CLARK. This should be discussed in closed session.

Mr. WEISL. Have you sufficient ships or vessels to launch the Regulus I, the only missile that you have in the surface-to-surface class?

Admiral CLARK. Yes, sir. We feel so, because of its limited capabilities. The ones that are following—

Mr. WEISL. No. Let us try to get what you now have first.

Admiral CLARK. Yes, sir; we have enough of this type.

Mr. WEISL. You have enough. Would it be against the national interest to tell the committee how many you have?

Admiral CLARK. We have 2 in operation at the moment, 2 submarines.

Mr. WEISL. You have 2—1 in the Atlantic—

Admiral CLARK. Yes, sir, 1 in the Atlantic and 1 in the Pacific; we have 4 cruisers.

Mr. WEISL. Do you consider two submarines equipped with Regulus I sufficient?

Admiral CLARK. I do for Regulus I; yes, sir.

Mr. WEISL. In what respect, Admiral, are the Navy missile problems different from the missile problems of the other services?

Admiral CLARK. We have extreme environmental problems, Mr. Weisl, principally, of course, the matter of space aboard ship, crowded magazines. We cannot have large numbers of launchers. Our missiles must be rapidly reloadable. They must be reliable because we live with them, live right on them. We cannot retire behind a hill when we fire a missile. We have problems of ship's motion, problems of stability. The space problem, I can give you an example of that, for instance.

We have the Terrier missile and the Army has the Nike missile. The Nike missile has a long baseline guidance. We do not have the space for this type guidance system. We must go to another one.

Mr. WEISL. Is the Terrier in operation now?

Admiral CLARK. Yes, sir; it is in the cruisers *Canberra* and *Boston* and the destroyer *Gyatt*.

Mr. WEISL. And what is the description of that missile, please, the Terrier?

Admiral CLARK. The Terrier is a solid propelled beam-rider missile. I can say here the range is something over 10 miles, the altitude something over 40,000 feet.

Mr. WEISL. What is it used for?

Admiral CLARK. It is for antiaircraft work.

Mr. WEISL. Do you have sufficient Terrier missiles?

Admiral CLARK. We have sufficient number of this type missile; yes, sir. We have a better missile following on.

Mr. WEISL. Has Terrier production been delayed?

Admiral CLARK. No, sir.

Mr. WEISL. What is the one following the Terrier?

Admiral CLARK. Just a moment. May I qualify that last statement, Mr. Weisl. The Terrier missile that I am talking about in the *Boston* and *Canberra* has not been delayed; no, sir.

Mr. WEISL. Is that known as the Advance Terrier?

Admiral CLARK. No, sir, the Advance Terrier is the follow-on missile.

Mr. WEISL. Is the what?

Admiral CLARK. Is the follow on missile to the Terrier, the advanced version of the missile we have been talking about.

Mr. WEISL. And you say that the advance Terrier has not been delayed?

Admiral CLARK. Production has been. It has not been delayed seriously in development but we are not starting production in the quantities that we would like to produce them, sir.

MANUFACTURER SAYS TERRIER PRODUCTION LIMITED BY FUNDING

Mr. WEISL. Would it surprise you if I told you that the manufacturer of the Terrier missile, in response to our questions, said the following:

The principal factor which has limited present Terrier production has been the lack of funds. A considerable increase in production could have been utilized several years ago had there been a sufficient urgent military need and subsequent funding for the additional quantities.

Admiral CLARK. Mr. Weisl, what that contractor has reference to is that he has a factory at the moment that could step up production

to something like a thousand missiles a month. I said that we are not producing the missiles in the numbers that we would like, that is correct. We are not utilizing the full capacity of the factory, and I think that is what the contractor is talking about.

Mr. WEISL. Do you think advance Terrier is an essential missile?

Admiral CLARK. I do; yes, sir.

Mr. WEISL. Is that being produced in sufficient quantities in a sufficiently accelerated time?

Admiral CLARK. In my opinion, it is not.

Mr. WEISL. Here is what the producer of that missile has to say:

The principal factors which have deterred the advance Terrier and Tartar programs have been the lack of funds and the need for resolution of certain technological problems.

Do you agree with that statement?

Admiral CLARK. Yes, sir; I agree with it.

Mr. WEISL. Then you are not producing or you are not getting these missiles as quickly as you should get them or as quickly as the national security needs them; is that not a fact?

Admiral CLARK. I see our difficulty here, Mr. Weisl. By "quickly" you mean in quantity. That is correct, and I agree with that; yes, sir.

Mr. WEISL. I assume that you need them in quantity or you would not order them in quantity.

Admiral CLARK. That is right.

Mr. WEISL. The Navy does not order missiles just to put them on the shelf. I assume that the Navy orders them because it needs them and needs them quickly.

Admiral CLARK. That is correct.

Mr. WEISL. And I am trying to point out to you, Admiral, what the producers of these missiles say is the trouble that is delaying them in getting them to you.

Admiral CLARK. Yes, sir; and I agree with them. I thought that you meant in point of time.

Senator JOHNSON. I point out to counsel that that is the same old story we have been hearing all through this hearing. Admiral Weakley just testified that we are ahead of them in know-how but behind them in can-do; is that not right?

Admiral CLARK. I suppose that is one way of putting it, Mr. Chairman, yes.

PROGRAMS HAMPERED BY FISCAL YEAR 1958 APPORTIONMENT

Mr. WEISL. I might add further so that the Navy knows this and knows the difficulty of our problem. If you men do not cooperate with us in laying your problems on the line there is no way that this committee can help you.

Now, the producer of your weapons makes this further statement:

The recent apportionment limitations imposed by the Department of Defense on fiscal year 1958 funds have hampered the Terrier and Tartar programs. The delay of 3 to 4 months has caused considerable programing difficulties in the Bureau of Ordnance, and for the contractors.

Do you agree with that statement?

Admiral CLARK. Yes, sir; I do agree with that.

Mr. WEISL. Now, tell us what other problems you have in the missile field?

Admiral CLARK. Aside from the direct impact on the development program of funds is also the impact on the missile development program of the research and development funds. Remember, in the guided-missile business in development of missiles we are at the end of the line. In other words, we can produce and develop missiles only as fast as the research and development agencies produce the necessary know-how. We try to keep abreast of the art, and I think that we have.

Mr. WEISL. I am sure of that, but after they develop the know-how, how long does it take you to convert the know-how into an operational missile?

Admiral CLARK. I think that we have moved very well in this regard, Mr. Weisl.

Senator JOHNSON. That depends on money and men; does it not?

Admiral CLARK. That is correct.

Senator JOHNSON. How much money you are given and how many men you are given and how quick you are given and in what amount?

Admiral CLARK. That is correct.

Mr. WEISL. We are not trying to blame the Navy for this. We are trying to tell you what we found out from the contractor as to what their difficulties are in producing these missiles and getting them to you.

We cannot possibly help the Navy or any other branch of the service unless they tell us what their problems are.

We are not experts.

Senator JOHNSON. Counsel, I should like to make a statement here. We have heard detailed testimony from the Army. They have told us their problems. They told us where they were short; they have told us what they need. They have made even some revolutionary suggestions about the changes that ought to be made to permit them to perform their specific mission in defending this country.

Now, we have the Navy. Tomorrow we will have the Air Force. I have no doubt but what they are going to present us with some imaginative proposals of their own. What we want to find out from you and what the counsel is trying to get on the record here is what do you need in the way of men and money and materials, morale, or anything else.

We believe in the Navy. We think it is constituted with able men. We think they are real leaders. We think they know how to do the job if they are given the wherewithal to do it. I remember reading an article written in another administration stating that we can whip them in both oceans at the same time.

It was written by Secretary Knox and appeared the morning after Pearl Harbor as I remember. I do not want that to come to pass again.

If the Navy does not put its case in this record it is going to be the Navy's fault and not ours.

Now go ahead, counsel.

Mr. WEISL. Admiral Burke?

Admiral BURKE. Mr. Chairman, could I answer that question please, sir?

Senator JOHNSON. Admiral Burke, we have had your testimony before and you have been sworn; go ahead.

TESTIMONY OF ADM. ARLEIGH A. BURKE, CHIEF OF NAVAL OPERATIONS, JOINT CHIEFS OF STAFF, DEFENSE—Resumed

Admiral BURKE. Mr. Chairman, the Navy is short of money, people, and ships for this advanced Terrier missile.

This advanced Terrier missile, the whole Terrier program, is one of the best missiles which we have been able to see. It is a good missile, it is excellent.

It has performed extremely well. Now, we did not want to go too fast on our first Terrier program, because we knew that we could develop a very good advanced Terrier later on with the experience that we would gain from the first Terrier.

Now, we have this advanced Terrier that is coming along. We do not have enough money for the ship fills for this advanced Terrier. We do not have enough ships that are equipped for this type of weapon. We need more men to man these ships.

Now, this is not something that has existed for too long, because we have just recently been in a technological position where we could move fast on this particular type of missile and these particular ships, but from now on and for the last year we have needed more missiles, more Terriers, advanced Terrier missiles, and we are going to need ships.

Senator JOHNSON. Did you ask last year for more money, for more missiles, for more men?

Admiral BURKE. Yes, sir.

Senator JOHNSON. And you were denied them?

Admiral BURKE. Yes, sir.

Senator JOHNSON. By whom?

Admiral BURKE. First, it is a normal budgetary process that you are cut down. I mean we get cut down in the normal budgetary process, and it has always been that way.

Senator JOHNSON. How much, do you remember, in this particular field now?

Admiral BURKE. I don't remember offhand, Mr. Chairman.

Senator JOHNSON. Could you supply that for the record?

Admiral BURKE. Yes, sir.

(Later, the following statement was furnished:)

Early in the budget process for fiscal year 1958, the combined Navy and Marine Corps estimate of the amount of funds required for procurement of missiles in that year was approximately \$960 million. In order to achieve balance in all programs within feasible funding and budgetary guidance, this amount was reduced to \$500 million when the budget was forwarded to the Secretary of Defense. The amount approved by the Secretary of Defense and the Bureau of the Budget was \$428 million. The amount finally approved in the appropriation act for the Navy and Marine Corps was \$371 million new obligational authority. There were no special requests for more personnel to man missile installations in fiscal year 1958 other than for regularly programmed ships and aircraft.

Senator JOHNSON. Counsel?

Mr. WEISL. Admiral Burke, I forgot to ask you one question when you last testified. You testified of your great respect for the capabilities of the Russian navy and their great submarine power, did you not?

Admiral BURKE. Yes, sir.

Mr. WEISL. Now, how does it happen that the Russian navy does not have a single aircraft carrier?

Admiral BURKE. They don't need them, sir.

Mr. WEISL. Why don't they need them?

Admiral BURKE. The responsibility of the Russians is to prevent us from carrying the war to them. Our allies are overseas. Our forces are overseas. A good many of our bases are overseas. We have to maintain absolute control of the seas so that our ships, our supplies, our reinforcements, our support for the allies, everything we need, everything that they need, gets there largely by sea.

Now, if Russia wants to stop us in naval warfare, she will stop us by trying to stop those ships. To do that, she will use such things as submarines, motor torpedo boats, destroyers, mines, land-based air, of which she has considerable quantity of naval land-based air, to prevent our ships from arriving. She does not have to come over here to land forces to support allies on this side of the ocean. She has to prevent us from supporting allies.

Now, in order for us to maintain control of the seas, we have to defend those ships that carry these supplies and defend our antisubmarine forces against all the threats which can be launched against them.

That means air threats, mining threats, submarine threats, and everything else. To protect those ships and to protect our lines of communications, we have to be able to defeat the enemy air which can be launched against us. That means that we have to have carriers, because we are fighting far from our own shores. The Russians are going to fight next to the Continent, next to Eurasia.

Mr. WEISL. We are not planning to attack Russia unless Russia attacks us; are we, Admiral?

Admiral BURKE. That is correct, sir; and if Russia attacks us—

Mr. WEISL. If Russia's plans are, and I am not saying that they are, and hope that they are not—but, if they should attack us, would not an aircraft carrier be very useful to them?

Admiral BURKE. It would be useful if they had enough of them, if they knew how to operate them; but it is not the thing that is essential to their use. If they capture or destroy Europe and Asia and Africa, we are in a bad way, indeed, sir.

Mr. WEISL. Indeed, we are. What guided missiles, Admiral Clark, and related weapons to guided missiles is the Navy developing?

Admiral CLARK. We have missiles in five categories.

Mr. WEISL. Sir?

Admiral CLARK. We have missiles in five categories, surface to air, air to air, surface to surface, air to surface, and surface to underwater.

As I say, there are 13 of these missiles. Would you like them named?

Mr. WEISL. Well, if you think that the committee ought to hear them.

Admiral CLARK. Well, there are three in the air, surface-to-air category, the Terrier, Talos, and Tartar.

In the air-to-air category there are two, the Sidewinder and the Sparrow.

In the surface-to-surface category we have the Regulus I, the Regulus II, and the Polaris missile you are going to hear about later.

And in the air-to-surface category we have two—the air-to-surface Bullpup and the Corvus. We have a couple of other developments I would rather not discuss.

Mr. WEISL. What is the Navy doing to accelerate the program of development of these missiles?

Admiral CLARK. We have asked for more money, Mr. Weisl, to accelerate our programs to keep them on the schedules that we think they should be on, and that is the best we can do.

Mr. WEISL. Has this money been denied to you?

Admiral CLARK. Yes, sir.

Mr. WEISL. By whom?

Admiral CLARK. By the usual budgetary process. When the Navy gets its money, it must be divided to maintain a balanced force, and the money which we have managed to squeeze out for guided missiles has kept us from carrying the development as fast as we would like.

Mr. WEISL. Well, who allocates that money after it is appropriated by the Congress?

Admiral CLARK. The Department of Defense.

Mr. WEISL. And does the Controller of the Department of Defense allocate it to the Navy?

Admiral CLARK. Yes, sir.

Mr. WEISL. Does he have any naval experts on his board or in his Department to advise him as to how much money should be allocated or when it should be allotted?

Admiral CLARK. He has naval people and, as a matter of fact, he is an ex-naval officer himself.

Mr. WEISL. What naval people does he have?

Admiral CLARK. He doesn't have any naval officers, no, sir.

Mr. WEISL. Has he any men on his board who are experts or who can help on what guided missiles are needed or when they are needed or how they should be used?

Admiral CLARK. In my opinion, no, not the Controller.

Mr. WEISL. Then how can he decide what function shall be allocated for that purpose?

Admiral CLARK. He doesn't decide what function to be allocated to the Navy.

Mr. WEISL. He doesn't decide the total amount to be allocated, but he decides when it should be allocated, does he not?

Admiral CLARK. In the apportionment process, yes.

Mr. WEISL. Is there anything else that you think the committee ought to know from you as Director of Guided Missiles for the Navy, which I have not asked you about, Admiral Clark?

Admiral CLARK. No, sir; except that I would like to add one comment—

Mr. WEISL. Yes, sir.

Admiral CLARK (continuing). In this matter of development times and speeds: We owe the United States not only a solid defense, but we owe them good management in these programs, too.

It takes the nicest kind of judgment in development programs to know when you should hurry them up and buy time. We feel that the management of these programs has been good, but we feel they should have been and could have been somewhat faster.

I do not think they should have been crashed.

Mr. WEISL. What do you suggest to this committee to be done to make them good and not crash, and to get them accelerated and not accelerated too fast?

Admiral CLARK. I do not know that the committee can do anything other than help us get the money that we need, and as far as the—

Mr. WEISL. Admiral, before you get the money you need, don't you think you have to make out a case to Congress? Congress, as liberal as it wants to be on defense, cannot give a blank check. It is up to the services to make out a case.

Admiral CLARK. That is correct.

Mr. WEISL. And tell them what they need it for, and why they need it, and why it is urgent, and why it ought to be accelerated.

Admiral CLARK. We have the programs, Mr. Weisl, not the dollars.

Mr. WEISL. Is there any other suggestion, Admiral, which you would like to make?

Admiral CLARK. No.

Mr. WEISL. Is there any suggestion, Admiral Burke, that you would like to make that you were not questioned about?

Admiral BURKE. No, sir.

Mr. WEISL. That is all I care to ask, Mr. Chairman.

Senator JOHNSON. Admiral Clark, do you consider the missile as the ultimate weapon?

Admiral CLARK. Not guided missiles as we know them now, no, sir. I do not think there is any such thing as an ultimate weapon.

Senator JOHNSON. Are you aware of any research in the Navy on weapons to replace missiles?

Admiral CLARK. Am I aware of research in the Navy to replace missiles?

Senator JOHNSON. On weapons to replace missiles.

Admiral CLARK. No.

Senator JOHNSON. Or are you aware of any research now taking place in the Navy on weapons to replace missiles?

Admiral CLARK. No, sir.

SAYS WE ARE AHEAD IN NAVAL-TYPE MISSILES

Senator JOHNSON. What knowledge do we have as to the status of Soviet naval-type missiles?

Admiral CLARK. We have considerable knowledge.

Senator JOHNSON. Are we ahead or behind them?

Admiral CLARK. I think that generally we are ahead, Mr. Chairman.

Senator JOHNSON. Would you care to discuss either of those questions any more in detail?

Admiral CLARK. Not in this session.

Senator JOHNSON. What do you have to do to get ahead, 1, 2, 3, 4, in your opinion?

Admiral CLARK. To better our position, you mean, Mr. Chairman?

Senator JOHNSON. Yes.

Admiral CLARK. First, to increase the funding.

Second, to smooth out the administrative processes in the Department of Defense.

Now, in this matter of organization, Mr. Chairman, the structure within the Department of Defense that is directly connected with the development programs is a satisfactory structure. The structure that has to do with the handling of funds is not.

The delays in funding, the repeated justifications before people who will have something to say about the funding can interfere with the program, I think that structure needs smoothing out.

Senator JOHNSON. Anything else?

Admiral CLARK. I think that those two would do it.

Senator JOHNSON. Admiral, we have had some recommendations made by scientists and manufacturers and embraced by testimony of many of our experts in the Army and in the Defense Department and other places. I would like to get your reaction on these recommendations.

1. The United States urgently needs to bring its missile and satellite-space program under an independent civilian commission or, we might say, under a recognized central authority.

2. There is a need for a permanent competent, adequate staff in the Department of Defense to provide leadership in basic and applied research.

3. The research and development program should be on a 3- to 5-year basis instead of an annual basis so there could be proper planning.

4. Contractors should have more leeway to make technical decisions.

5. Reduce lead time by making early and firm decisions.

6. Eliminate all overtime restrictions.

What comments do you have to make on those six suggestions?

Admiral CLARK. As far as the first one is concerned, I agree with that, with modifications. I believe that if we are to get on with the space business and get on with it we must, we certainly must see that our talents and resources are pooled, and I think this should be within the Department of Defense.

Now, in the early days of aviation, the Congress of the United States established the National Advisory Committee for Aeronautics to produce the research and the development and the advances in the aeronautical sciences that would advance aviation.

The NACA has done a magnificent job. The information from NACA has been pumped into contractors, into the Department of Defense, and I think this country stands very, very well in aviation.

This same information has come to the guided-missile business. A similar agency or the same agency could be established or continued to provide the same sort of work and the same research and development in the field of space flight.

It should not be in the hardware business. It should not be building anything. It should produce this information, this knowledge, and it should be sent——

Senator JOHNSON. To the space department or space committee?

Admiral CLARK. Whichever you want to call it, but it should restrict itself to the gathering of information, the gathering of knowledge and the—as far as space weapons, it should be in the Department of Defense and not a separate agency.

Senator JOHNSON. What do you think about the other five?

Admiral CLARK. Well, would you mind repeating them?

Senator JOHNSON. The research and development programs should be on a 3- to 5-year basis instead of an annual basis.

Contractors should have more leeway to make technical decisions.

Reduce lead time by making an early and firm decision.

Eliminate all overtime restrictions.

Admiral CLARK. I agree to the 3 to 5 years in research and development programs.

I do not know what the contractor means by more technical decisions.

Senator JOHNSON. More leeway to make technical decisions on their own, I assume, without having to come back and go through all the jungle of redtape at the Pentagon.

Admiral CLARK. I would agree with that; yes, sir.

Senator JOHNSON. And the overtime restrictions?

Admiral CLARK. Yes, sir. I think there should be more latitude.

Senator JOHNSON. So you would agree with them, with the modification to No. 1?

Admiral CLARK. That is right.

Senator JOHNSON. Senator Bridges?

Senator BRIDGES. Admiral, let me preface what I am going to ask you by saying that, as you know, I am a firm believer in individual departments and a competitive spirit between the departments. I do not agree at all with some of the statements which have been made that we will do away with all competition by placing everyone in a single military service. However, there has been called to our attention the fact that in a situation such as the Navy's program on Regulus I, and the Air Force's Matador, you were both seeking essentially the same thing; that it was a duplication all the way through, and eventually resulted in the development of strikingly similar weapons.

Would you care to comment on that?

Admiral CLARK. Well, first, to speak to that particular project that you are talking about, Mr. Bridges, in the case of the Regulus I and the Matador, the missiles were very carefully compared in the early stages.

The Matador did not have folding wings. It didn't have the structural qualities necessary to use aboard a submarine, and the Navy could not use it.

On the other hand, the Navy devised a guidance system that would suit well for our submarines, and the Air Force preferred a different kind of guidance system.

Now, it is very true that the missiles are similar; they have the same range, they carry the same warhead, and certainly I think the Air Force could have used the Regulus I had they so chosen.

But, as I say, there were certain changes in the guidance system that impelled them to go the other way.

Now, as far as other duplications and possibility of duplications, we have a committee in the Department of Defense, chaired by Mr. Holaday, in which all the guided missile heads of the services are members. We carefully compare our programs, our proposals. There is the closest kind of cooperation in the exchange of information.

No service since the early days, of course, when we were all groping and there were multiple approaches in those days, none of us knew where we were going or how to go, but since those days, no service ever proposes a guided-missile program without telling the other services and asking them if they can use it. If they can't use it, what modifications could they make to make it usable for them?

And this is very carefully gone over, and before they go to the Department of Defense for approval to proceed with the program.

Now, a recent example of this is in the air-to-surface missile. The Air Force and the Navy, dealt together with this problem. The Navy was restricted in the size of the missile because of the size of our aircraft on carriers. The Air Force does not have this restriction; they want a bigger missile and a longer range missile.

The result will be two missiles.

ENVIRONMENT MAKES THE DIFFERENCE

Now, this can be a charge of duplication, because the missiles do the same thing. But here, environment dictated what would be done.

And it certainly does not make sense to tell the Air Force that they must restrict their range and their capability because they have to use a missile that we have to use because of the size of our aircraft.

Senator BRIDGES. At the present moment, is there a clearinghouse in the Department of Defense where the Navy clears with the Air Force, the Air Force with the Army, and so forth, on missile programs?

Admiral CLARK. Yes, sir. This committee that I spoke of, new projects are always presented there. We discuss them, and we discuss whether they should be approved or not, whether we think there is duplication.

We have representatives at the various Air Force installations. My staff is in daily contact with their counterparts. In one case, in the Atlas program, for instance, we have a naval officer who is working in that project just as any of the Air Force officers are. The only difference is, he wears a dark blue suit instead of a light blue suit.

We have close liaison between contractors and with contractors. I think there is a complete exchange of information.

Senator BRIDGES. Admiral, have you had or are you having trouble getting quick decisions?

Admiral CLARK. The Navy is not; no, sir. We have presented programs to the Department of Defense, the Assistant Secretary for Guided Missiles, and we have received approval on missiles promptly.

Senator BRIDGES. Do you think that Mr. Holaday has sufficient authority now so that he can give you the answer without resorting to substantial delays?

Admiral CLARK. Mr. Holaday has never in any case delayed a Navy missile by withholding approval to begin the program.

Senator BRIDGES. Has he delayed it as the program has progressed?

Admiral CLARK. No, sir, not technically.

Senator BRIDGES. That is all.

INTERSERVICE RIVALRY

Senator JOHNSON. Senator Kefauver.

Senator KEFAUVER. Thank you, Mr. Chairman.

Admiral Burke, we have had reports and a good deal has been written in newspapers and just this past weekend, there was an article about how the Air Force and the Navy were in severe conflict, not just rivalry.

Are you familiar with this article by Jack Anderson?

Admiral BURKE. Yes, sir; I read the article this morning, sir.

Senator KEFAUVER. Well, what is the truth?

Is is true about this propaganda sheet that Admiral Gallery was supposed to have put out?

Admiral BURKE. If I remember rightly, that was a long time ago, I think it was in 1946 or 1947, 10 years ago. I never saw a copy of the thing myself, sir.

Senator KEFAUVER. It says that Admiral Gallery wrote:

The time is ripe now for the Navy to start an aggressive campaign at proving that the Navy can deliver an atomic bomb more effectively than the Air Force can. The Air Force will never be able to match the performance of our A-bomb carriers with transoceanic bombers. The same thing would apply to ship-launched missiles versus transoceanic-guided missiles—

that is quoted from what he is supposed to have written.

And he says further of the effort of the Navy, that you established an Operation 23, which was a propaganda committee for the purpose of influencing Members of Congress. And also I am not so much interested in the past, but I would be interested in knowing if that is true—and if that kind of thing has ceased to exist between the Air Force and the Navy?

Admiral BURKE. There is always competition between any group of, any 2 or 3 groups of people.

Sometimes that competition goes too far. Usually it does not. The cooperation between, among the services now is good. We are in all of the Air Force laboratories—they are in ours.

We exchange a tremendous amount of information. I don't think that there is anything going on now the way Mr. Anderson's article implies.

Now I don't mean to say that we agree with the Air Force all the time or that we agree with the Army or even that we agree amongst ourselves in the Navy all the time.

Senator KEFAUVER. It says here that the Navy set up a secret unit called Operation 23 which began churning out anti-Air Force propaganda under command of Admiral Arleigh Burke. [Laughter.]

It consisted of 12 officers, 17 enlisted men, and civilian specialists.

Admiral BURKE. One Air Force officer.

Senator KEFAUVER. It said you got one fellow who was not quite loyal to the Navy and he spilled it to the Air Force?

Admiral BURKE. Mr. Anderson is more familiar with that. I don't have a roster of the people who were there 10 years ago but maybe he was right.

Senator KEFAUVER. Well, did you have a secret propaganda committee to downgrade the Air Force?

IT WAS NO SECRET

Admiral BURKE. I think most everybody in Washington and everybody in the United States knew all about that and I think the only reason I am here now is because they did know about it.

I mean, I don't think that there was anything very secret about it.

Things that happened in that office everybody knew about; that is the only reason that I am here, Senator Kefauver.

Senator KEFAUVER. It is good to hear that kind of thing is not going on now. It is not going on now; is that what you are saying?

Admiral BURKE. What I am saying, Senator Kefauver, is that there is no organization—and I am sure this is true in the Air Force and

I am sure it is true in the Army—I am sure there is no organization in either one of those services to undercut the Navy.

I am sure there is no organization in the Navy to undercut either one of the other services, and that article, I think, implied that there is or was.

Senator KEFAUVER. It is more than implied.

It says in plain terms that you were undercutting.

Admiral BURKE. Yes, sir.

Senator KEFAUVER. May I ask one further question?

I attended the British air show this summer and I saw a very good ultraviolet homing missile they have. Doesn't the Navy have a similar type, called the Sidewheeler?

Admiral BURKE. Called what, sir?

Senator KEFAUVER. What is it called, yours?

Admiral BURKE. We have various types of homing heads, homing devices in missiles. The details I would rather not go into except in executive session.

Senator KEFAUVER. Well, the point is, do you have a program of working together with the Navy of allies like the British?

Admiral BURKE. Yes, sir.

Senator KEFAUVER. How is that program carried out?

Admiral BURKE. Well, we have scientists over there in the Office of Naval Research who are in Britain, and we exchange a great deal of information and, like this Farnsboro show, you probably know a good many of our people were over there and a good many of them had access to their laboratories.

Every once in a while we exchanged teams.

The British Navy, for example, has just in the last past week had a considerable-sized team over here, not only for the Navy but for all of the Departments of Defense to get, to exchange information, and also to generate plans on how we can do it better.

There is some time delay sometimes in the exchange of information, and sometimes too much time delay, not—

Senator KEFAUVER. Do any laws need amending to enable you to do it better or do you have any recommendations how there could be a more fruitful exchange?

Admiral BURKE. The Atomic Energy Act of course prohibits us from exchanging information along that line. My personal opinion would be it would be beneficial if the Atomic Energy Act were loosened so we could provide to Britain and to other allies who are qualified to act, information on nuclear powerplants and perhaps material itself.

Senator KEFAUVER. Thank you, Mr. Chairman.

Senator JOHNSON. Senator Saltonstall.

Senator SALTONSTALL. Thank you, Mr. Chairman.

A very few questions.

Admiral Clark, might I ask you what you mean by a prompt decision by the Department of Defense in the point of view of time?

Admiral CLARK. I mean immediately, Mr. Saltonstall.

I can go to the Department of Defense with a new missile program and get a decision almost then and there as far as the new program is concerned.

Senator SALTONSTALL. And from your point of view there are no administrative delays in the present system?

THE DELAYS RELATE TO FUNDING

Admiral CLARK. As I said a minute ago, as far as the development programs are concerned, there are delays in the fiscal structure.

Senator SALTONSTALL. In the what structure?

Admiral CLARK. In that part of the structure that handles the fiscal matters.

Senator SALTONSTALL. In other words, it is the money coming from the Bureau of the Budget to the Defense Department and down to the Navy?

Admiral CLARK. That is correct; yes, sir.

Senator SALTONSTALL. Now we have heard a lot about the number of committees, particularly in research and development work.

Have the committees that have to do with your work delayed you? Are there too many committees?

Admiral CLARK. No, sir. We don't do business in the development of guided missiles by committee, that is we do not manage by committee. We have innumerable committees, but in every case they are committees for the exchange of information.

Senator SALTONSTALL. And they have not delayed you in going ahead with your work?

Admiral CLARK. No, sir.

Senator SALTONSTALL. I like what you said about trying to keep a nice balance between going ahead, building up the present strength, and not building up too many of a weapon that might become obsolete.

One of the great problems today in the Navy and the Air Force particularly is keeping the balance between present strength the presently existing power—and not building up such an inventory of those weapons—that you do not then have the funds and the opportunity with contractors and industrial establishments to go ahead with new weapons in a development.

That is what you mean, isn't it?

Admiral CLARK. That is correct; yes, sir. I can give you a fine example of that, Mr. Saltonstall.

When we first started in the Jupiter program with the Army, it was agreed between the Army and the Navy that the Navy would undertake the development of a solid fuel engine.

In the meantime we looked at plans for ships and the plans for the weapon itself. It was a tremendous weapon. It would have meant a tremendous ship. We pursued the research and development in the solid propellents, and some of the techniques of guidance, and about 8 months later a breakthrough—there was a scientific breakthrough in the size of warheads that completely changed the whole picture.

Now I would ask you suppose we had got started on this, not when we did but a year prior to that, had crashed this program, started building these monstrosities, building huge ships. We would have been at a place where we would have had to start all over and endless millions would have been down the drain.

Senator SALTONSTALL. I think that is a very clear example. In other words, you believe in going ahead step by step and not getting ahead of yourself, so to speak, so you have to throw away too much of your work.

Admiral CLARK. That is precisely it, Mr. Saltonstall.

Also keeping a careful analysis of the world situations, the world tensions, and being prepared to step up the developments when it appears that this is the time.

Senator SALTONSTALL. Admiral Burke, you are back on the stand and there is one question I did not get to ask you the other day, I would like to ask it now.

You have given the missions of our fleet to keep the seas clear so that we can go anywhere we want, and two, to protect our shores.

Those are the missions, aren't they?

Admiral BURKE. Yes, sir.

Senator SALTONSTALL. And the present-day Navy under your command as the Chief of Naval Operations, is it capable of carrying out those missions in your estimation?

CONTROL OF SEAS WILL BE DIFFICULT

Admiral BURKE. We think that as of now we can.

In the future it may be more difficult. It is not something that we can do easily though, that we can do for sure. We know that we are going to lose ships.

We know that it is going to be a difficult matter to hold the control of the seas.

We know it is not easy and it is going to be a most difficult job.

We know that we cannot do it quickly. It is going to be a war of attrition. It is going to be a war that will take some time to wipe out all of the enemy submarines, for example.

We think we can do it now, sir.

Senator SALTONSTALL. But with the weapons that we have as opposed to the weapons you know any opponent in the world has today, with the weapons that we have, the men that we have, the fleet that we have, we have a present means of carrying out the Navy mission in your opinion?

Admiral BURKE. I think so; yes, sir.

Senator SALTONSTALL. Thank you, Mr. Chairman.

Senator STENNIS. Senator Symington?

Senator SYMINGTON. Admiral, I want you to know that I have also heard of Operations 23.

Admiral BURKE. I am sure you have, sir.

Senator SYMINGTON. And I want you to know that in my opinion you are a great officer and a great gentleman.

Admiral BURKE. Thank you, sir.

Senator SYMINGTON. I am proud to be a citizen of the same country that you are.

Admiral BURKE. Thank you, Senator.

Senator SYMINGTON. In all the years that you have been in the Navy, I have never heard anybody in the Air Force or the Army state that you had been unfair or unilateral in your approach to our national defense, let me congratulate you on that.

Admiral BURKE. Thank you, sir.

Senator SYMINGTON. There are some things we may differ on. Admiral Clark, I would like to refer to some testimony of yours of last year.

I asked you in 1956:

You say you feel that the Navy will not be complicated by a ballistic missile attack?

Your reply was:

No, sir. I don't think a task force would be a target for a ballistic missile at all.

I asked you:

Why not?

And you, Admiral—incidentally Admiral Burke if at any time you would like to supplement any reply from Admiral Clark, that would be fine.

Admiral BURKE. All right, sir.

Senator SYMINGTON (reading):

Admiral CLARK. A ballistic missile has to know its target right at the minute. Now it is possible, of course, for a task force to be tracked for some time, and the advance position perhaps assumed or guessed and then you fire at this particular point.

But with the accuracy of ballistic missiles and the fact that once it is gone it is on its own, there is no changing it then; it must know its target accurately.

Senator SYMINGTON. In other words, the guidance capacity of a ballistic missile is such that if a fleet was at sea, it would be very difficult for the missile to be guided to give you trouble; is that it?

Admiral CLARK. Yes, sir; it would be a very wasteful employment of ballistic missiles. I do not think they would be used.

Senator SYMINGTON. The other side of that is that you have some right effective weapons on that carrier.

Of course by that I meant nuclear weapons.

They either get the carrier or the carrier is going to get the city, if you are carrying hydrogen bombs, which I hope you are if we are in serious trouble.

Admiral CLARK. That is right.

Senator SYMINGTON. What is the speed of a ballistic missile? Mach 15? That would be about 10,000 miles an hour, wouldn't it, something like that?

If a ballistic missile has a hydrogen warhead, it is going to go a long way in a pretty short time?

At that point I mention for the record there is a "D" which means there was something deleted for classification.

Admiral CLARK. It will cover that in about 25 or 30 minutes.

Senator SYMINGTON. It will do better than that?

Admiral CLARK. 1,500 miles.

Colonel GALER. Roughly 100 miles a minute.

Then dropping down just a little bit more:

Senator SYMINGTON. In open hearing, we had a member of the AEC before a subcommittee of the Senate Armed Services Committee.

That was a committee chaired on civil defense by the distinguished Senator from Tennessee—

who said that in an air burst radius of total destruction would be 4 miles, the diameter therefore 8 miles, total destruction. That would give you an area of some 48 square miles. Especially as a water burst of a hydrogen bomb is particularly lethal, I would not think you could dismiss it as not being a possibility.

Admiral CLARK. We do not.

That was the testimony about a year and a half ago, Admiral Clark, and I would like to ask you, based on recent developments, do you still believe that the division of appropriation and interest in the Navy between the carriers and submarines is still the right way to do it?

Admiral CLARK. The division of appropriations between the carriers and our submarines?

Senator SYMINGTON. That is correct.

Admiral CLARK. I will defer that to Admiral Burke on this one.

Admiral BURKE. As I stated yesterday, Senator, the most difficult problem in the world is the balance of things.

You have got to have balance not only between immediate readiness and future capability which you are so interested in, and I think very correctly so, but also within those various categories how much do we put in antisubmarine warfare, how much in submarines.

How much do we put in carriers, how much in submarines?

Senator SYMINGTON. I understand.

Admiral BURKE. And that is the most difficult problem there is, and there is no specific and definite answer that you can go to and prove that you are right.

Now the carriers have got a very difficult job to do.

They have got to have the capability of doing that job. So do the submarines. Within the last year there has been an increase in the capability of the submarine ability to destroy large targets with the Polaris weapons system, so the emphasis with that type of weapon will increase from now on.

Senator SYMINGTON. Could I put it to you this way:

Instead of building more weapon carriers at 35 knots on the surface of the sea, inasmuch as our possible enemy is now building weapons in the air which go many thousand miles an hour, would not it be better to invest more of our wealth in things which go faster under the sea than ever before, and therefore are more difficult to detect; especially if they can utilize the modern weapons?

Admiral BURKE. It is important, they are important, but you cannot do that to the exclusion of other things.

You cannot—

Senator SYMINGTON. I did not say that.

Admiral BURKE. I know it, sir.

Senator SYMINGTON. I asked you if you were satisfied with the current ratio. That was my question.

Admiral BURKE. I am largely responsible for determining the current ratio. I might say that I am satisfied with it, sir, but it is not an easy problem to solve, and that ratio does not stay fixed. It is not something that you fix now and it is so forever more or even that for next year it is going to be the same thing.

It changes.

Senator SYMINGTON. Let me pursue this with you a bit.

I believe the figure now in the record about Russian submarines is over 400, is that correct?

Or over 600?

Admiral BURKE. About 500, sir.

Senator SYMINGTON. And the figure, estimated a relatively few number of years now is a great deal larger than that?

Admiral BURKE. There have been some recent changes that I would like to discuss in executive session, sir.

Senator SYMINGTON. Fine. Would you prefer to tell in executive session how many hundred more submarines the Russians have in operation than we have?

Admiral BURKE. No, sir. We have 110 submarines in operation now. The Russians have in the neighborhood of 500.

Senator SYMINGTON. And how many are we building a year and how many is it estimated they are building a year?

THEY BUILD 100 A YEAR; WE BUILD 5 OR 10

Admiral BURKE. It was estimated they built yearly about a hundred, sir, the year before last they built about 100. We have not a final check. We are building between 5 and 10. It varies from year to year.

Senator SYMINGTON. I feel most sincerely that a submerged submarine, with a missile unit like the Polaris, may be the most lethal offensive weapon of all. Should not we readjust our concept about submarines and make them more of an offensive weapon in our minds instead of a defensive weapon?

Admiral BURKE. It is an offensive weapon, sir, but I would like to point this out about this missile submarine which is a wonderful weapons system, and we have great hopes for it and we think it will contribute a great deal to the retaliatory capability of this country. But unfortunately the only thing that that missile submarine is good for is mass destruction, destruction of areas, because of its warhead, the expense of its missiles, the accuracy of it, possible accuracy of it.

Senator SYMINGTON. Not if you surfaced and used the Regulus II against an airfield.

Admiral BURKE. Sir?

Senator SYMINGTON. Not if you surfaced and used the Regulus II against an airfield.

Admiral BURKE. An airfield, a specific point.

I was thinking of Polaris.

Senator SYMINGTON. Right.

Many times you and I have kicked it around in private conversation, the fact that submarines for us are to defend our shipping lanes, and the Russians would attack our shipping lanes. On the other hand, dealing now from the standpoint of offense, the submarines might be good offensive weapons for us, also, might they not?

Admiral BURKE. That is exactly why we are putting a great deal of emphasis on this Polaris submarine, sir.

It is just for that purpose. Again I would like to point out this Polaris submarine has no capability in limited warfare, and there are lots of things that have to be done that it cannot do, but it is a very valuable weapon.

Senator SYMINGTON. I won't pursue this now.

Your answers are clear. But I would like to say that, as a member of the Armed Services Committee, when you come up next year, I hope we can get into this and you can clear me up.

I am not quite clear at this time.

Admiral BURKE. All right, sir.

Senator SYMINGTON. Thank you for your answers.

Mr. Chairman, I have no further questions.

Senator STENNIS. Senator Bush?

Senator BUSH. No questions.

Senator STENNIS. Admiral Clark, I have just 2 or 3 questions here.

Did you say that we now have the capability to cope with the Russian submarine threat or any threat that you think they could throw at us now?

Admiral CLARK. No, sir; I did not say that.

Admiral BURKE. I said that, Mr. Chairman.

Senator STENNIS. Admiral Burke, you were the one that said that. What do you mean "Have the capability"?

WHEN RUSSIANS GET NUCLEAR SUBS, PICTURE CHANGES

Admiral BURKE. I think that as of the moment with the Russians with conventional submarines, that it would be a terrific battle.

I think we would eventually win it. As soon as the Russians get nuclear power in their submarines, as soon as they get that combined with missiles, we can't do it with the equipment, the forces that we have now.

Senator STENNIS. What is your information now about them having the very kind of weapons that you describe when you said as soon as they get that particular weapon?

I have understood that this threat has been continuing for some time, more than a year.

Admiral BURKE. The probability that they would eventually have and the fact that we have been very urgently working on trying to solve the problem, that is true.

We have no concrete proof that the Russians have a nuclear-powered submarine. We know they have been working on it.

Senator STENNIS. You stop at that. You mean we have a capability provided they have only what you call the conventional submarine?

Admiral BURKE. That is correct.

Senator STENNIS. But if they have more than the conventional submarine, then we are not prepared to cope with it, is that right?

Admiral BURKE. I would say that it would be most difficult.

Senator STENNIS. As I have understood, in this 2 billion new dollars that may be requested, antisubmarine warfare is one of the chief items?

Admiral BURKE. That is correct, sir.

It is because of this growing threat, the probability that if Russia does not have them now she soon will have a nuclear-powered missile submarine, and that is why—

Senator STENNIS. So if they have now a nuclear-powered submarine, you are not prepared to cope with that?

Admiral BURKE. We are not prepared—I would not want to say that we can surely handle it.

Senator STENNIS. All right, if they have a missile submarine, you are not prepared to cope with that?

Admiral BURKE. As long as it is the snorkel-type submarine, sir, we can probably take them to camp, but we are going to get hurt. We are not going to be able to do this without us getting hurt.

Senator STENNIS. I am getting into this appropriation question now because we will soon have a recommendation on it, I suppose.

You don't want to leave the impression here that you don't need additional funds?

Admiral BURKE. No, sir, because the Russians are not going to stop with what they have right now.

We know that they have been working for several years on nuclear power in their submarines.

We know that they have been working on missiles.

Senator STENNIS. You have been working for several years trying to get ready for them and get more money to get ready for them?

Admiral BURKE. That is true, sir, and that is why—

Senator STENNIS. Has your money been refused, this money for this additional program?

Admiral BURKE. As it always happens, sir, every time we ask for appropriations they are cut, and they are cut through the whole budgetary process, and this has happened a long, long time.

After the budget is once presented, then we support the budget, sir.

Senator STENNIS. But I have been hearing several years, Admiral, on the Armed Services Committee that the Russian threat was from submarines and missiles.

Admiral BURKE. Yes, sir.

Senator STENNIS. That was general talk around the table and by the witnesses generally.

Now, my question was what have you been doing to get ready for this submarine threat, and if you have been denied any funds for that specific purpose?

Admiral BURKE. Yes, sir, we have been, both in our shipbuilding and aircraft procurement and our research funds.

Senator STENNIS. You have been denied funds for research on this very program. When was that, if you can recall?

Admiral BURKE. Every year, sir. We start with a much greater budget than is finally presented.

Senator STENNIS. As far as I knew, I don't recall that any time there has ever been an item taken out by the Appropriations Committee for these purposes.

It could have happened and I would not remember it.

Admiral BURKE. That is correct, sir, and the reason for that is that last year you supported the budget for research. The reason for that is that once the budget is made up, we support the budget, and that is the way it should be. That is the way it has got to be.

Senator STENNIS. Anyway, you are going to need additional funds, and a large amount of these additional funds for research and development on this very problem I have been pointing out.

Admiral BURKE. The funds we have been primarily questioning, the increase is for research and development, procurement of anti-submarine warfare ships and aircraft, and procurement of missile submarines, Polaris submarines specifically.

Senator STENNIS. And you use the carriers as an integral part of this additional program, do you not?

Admiral BURKE. Yes, sir.

Senator STENNIS. They play a part in it?

CARRIER ESSENTIAL TO ANTISUB WARFARE

Admiral BURKE. Yes, sir; the carriers are essential to antisubmarine warfare.

Senator STENNIS. May I briefly ask Admiral Clark just one question here about delay in selecting contractors and coming to terms after you have decided on a project that you want.

Do you encounter any delay there in getting the project under a contract?

Do you make the contracts or provide for—I don't know how far you go in your special subject, but I have an idea there is a lot of delay because of getting the contracts started and getting them approved and getting different engineering advices on it.

Have you encountered trouble or delay in that connection?

Admiral CLARK. The actual contracting is handled by our materiel bureaus, but when the Chief of Naval Operations establishes a requirement for a guided missile, and this is presented to the bureaus, they immediately call in a number of contractors to submit proposals.

When the proposals come in, they select one, and then of course that is when the contractual procedures begin. These contractual procedures are time consuming; yes, sir.

Whether they could be pressed or not I would not know.

I have not personally dealt with them.

Senator STENNIS. Who handles that part of it?

Admiral CLARK. The materiel bureaus, Bureau of Aeronautics, Bureau of Ordnance, Bureau of Ships handle the contractual arrangements and they actually prosecute the program.

Senator STENNIS. Do we have other questions?

Senator SYMINGTON. Mr. Chairman.

Senator STENNIS. Senator Symington?

DEFENSE WOULD BE BY FORCES IN BEING

Senator SYMINGTON. Admiral Burke, we have heard a great deal about missiles. I am sure we all want to do the best we can in the missile field, as rapidly as possible. But, if this country, or any of its allies to whom we are irrevocably committed, was attacked tomorrow, we would have to defend ourselves with the forces in being, would we not?

Admiral BURKE. That is absolutely correct, sir.

Senator SYMINGTON. I understand that, after a budget is set, you support that budget. I am familiar with that system, and do not criticize it. On the other hand, we feel up here that, when you come up and give us sworn testimony, we have the right to ask questions which do not involve anything except your own opinion and the facts. To the best of your knowledge, have any of the reductions in procurement, in maintenance and operations, in research and development, in personnel and training, other than missiles, have any of the reductions made in the calendar year 1957 and the fiscal year 1958 been replaced since the 4th of October?

Admiral BURKE. There was one on research.

Senator SYMINGTON. That was the 10-percent cut?

Admiral BURKE. Ten percent on research. That was replaced. To my knowledge, I do not know that any of the others have been replaced, sir.

Senator SYMINGTON. Except for that \$170 million which, actually, was not taken away. It was planned away, but it was not actually taken away; is that right?

Admiral BURKE. That is right, sir. The programs were stopped.

Senator SYMINGTON. So as far as you know, in appropriations and in expenditure ceilings, except for that one, \$170 million, as far as you, Chief of Naval Operations, know, that is the only one; is that right?

Admiral BURKE. There is another one. There is an overall increase of about \$100 million in aircraft procurement; aircraft procurement was increased about \$100 million.

Senator SYMINGTON. Was that not a change in policy; namely, that the Government would continue to pay as agreed instead of asking the contractor to pay?

Admiral BURKE. That is correct, sir.

Senator SYMINGTON. I think that is right.

Admiral BURKE. That is right.

Senator SYMINGTON. And, if the amount of money is \$38 billion, \$190 million would be one-half of 1 percent, so you can say that, except for missiles, some fields of missiles only, the increase in what we are now doing in the way of our defenses as against prior to October 4 is less than one-half of 1 percent; is that about right?

Admiral BURKE. Yes, sir.

Senator SYMINGTON. \$170 million as against \$38 billion plus, whatever percentage that is.

Thank you, Admiral.

No further questions, Mr. Chairman.

Senator STENNIS. Well, Admiral, you have helped us here in your testimony, and we feel that you have strengthened the record, too, and made a great contribution. We want to thank you, Admiral Clark. I am directing my remarks to you. You are excused now, so far as the committee is concerned, and thanks to you again, and to Admiral Burke.

The next witness we have on our list is Rear Adm. William F. Raborn, Jr., Director, Special Projects, of the Naval Bureau of Ordnance.

If you will come around, please, Admiral.

Admiral Raborn, hold up your right hand, please. Do you solemnly swear that your testimony here before this committee will be the truth, the whole truth, and nothing but the truth, so help you God?

Admiral RABORN. I do.

Senator STENNIS. Have a seat.

(Admiral Raborn's biographical statement follows:)

REAR ADM. WILLIAM F. RABORN, JR., UNITED STATES NAVY

Admiral Raborn is Director, Special Projects, Naval Bureau of Ordnance.

He was born on June 8, 1905, in Decatur, Tex. He was graduated on June 7, 1928, from the United States Naval Academy.

In 1928, he had gunnery duty aboard the U. S. S. *Texas* until December 1932, after which he had consecutive duty in the destroyers *Twiggs* and *Dickerson* until June 1933. Completing flight training at the Naval Air Station, Pensacola, Fla., he was designated naval aviator on April 16, 1934, and in June of that year joined Fighting Squadron 5 on the U. S. S. *Lewington*. Later he served with Fighting Squadrons 10 and 11 aboard the U. S. S. *Portland*.

He returned to the Naval Air Station, Pensacola, in June 1937. In August 1942, he reported as officer in charge of the Free Gunnery School, United States Naval Air Station, Kaneohe Bay, T. H.

Assigned next to the Office of the Deputy Chief of Naval Operations for Air, he served as head of aviation gunnery training in the Training Division from March 1943 to the fall of 1944, after which he joined the U. S. S. *Hancock* as executive officer.

For 2 years, June 1945-June 1947, he served as chief of staff to commander, Task Force 38, and commander, Carrier Division 2 (U. S. S. *Princeton*, flagship), in the Western Pacific. He next had duty as operations officer on the staff of commander, fleet air, west coast, with headquarters in San Diego, Calif., and in July 1949 was assigned to the Bureau of Ordnance, Navy Department, Washington, D. C. In July 1950, he assumed command of the U. S. S. *Bairoko*.

From August 1951 to June 1952, he attended the Naval War College, Newport, R. I., and the next month reported as Assistant Director of the Guided Missiles Division, Office of the Chief of Naval Operations, Navy Department. He continued to serve there until April 1954, when he assumed command of the U. S. S. *Bennington*.

Ordered detached from the *Bennington* in February 1955, he served as assistant chief of staff for operations on the staff of the commander in chief, United States Atlantic Fleet, and on December 5, 1955, reported as special project officer, Office of the Secretary of the Navy, Navy Department.

Admiral Raborn has received numerous decorations, including the Silver Star Medal, the Bronze Star Medal with Gold Star, and the Commendation Ribbon with Bronze Star.

TESTIMONY OF REAR ADM. WILLIAM F. RABORN, UNITED STATES NAVY, DIRECTOR, SPECIAL PROJECTS, NAVAL BUREAU OF ORDNANCE

Senator STENNIS. We are glad to have you here, sir, and look forward to your testimony, and we will ask counsel for the committee now to proceed with the questions.

Mr. WEISL. Mr. Vance will question Admiral Raborn.

Senator STENNIS. All right, Mr. Vance.

Admiral, you have a formal statement, I believe. Would you like to read your statement, or have it put in the record?

Admiral RABORN. I would like to have it put in the record. I can give you a thumbnail sketch of it.

Senator STENNIS. If you will make a summary.

Mr. Reporter, that goes in the record.

If you will give us a sketch as you see fit, and counsel will then question you.

Admiral RABORN. Thank you, Mr. Chairman.

(Admiral Raborn's statement follows:)

Mr. Chairman, I am Rear Adm. W. F. Raborn, United States Navy, Director, Special Projects, charged with responsibility for the development of the fleet ballistic-missile system and its associated missile, Polaris.

I am pleased to have this opportunity to supply any information which I possess and which will be of use to this committee.

This system is unique in two important respects. It is designed for shipboard launching, at sea, and it employs a solid propellant motor.

The advantages of the fleet ballistic-missile system stem from the sea-based, ship-launched concept. Carried in submarines, the weapon is effectively concealed from the enemy. The mobility of a shipboard launching platform denies to the enemy the opportunity to zero in his defenses.

The launching ship occupies an unobserved, unpopulated area of the earth relatively free from espionage, sabotage, and civil-defense problems. Use of free ocean launch areas brings most of the prospective target areas of the world within reach of an IRBM.

SOLID PROPELLANT SUPERIOR FOR SHIPBOARD USE

The solid propelled Polaris embodies the most advanced component designs available today, consistent with the planned availability date. This includes warhead, reentry body, metal parts, propulsion, guidance, and controls. The design is susceptible to economical improvement by incorporating state-of-the-art advances as they occur.

Earlier plans called for use by the Navy of the Army Jupiter missile. However, the advantages of a solid propellant for shipboard use are so overriding that, in December 1956, the Navy obtained permission from the Secretary of Defense to proceed with the smaller, solid-fueled Polaris missile for the fleet ballistic-missile system.

Liquid propellants, difficult to handle ashore, present almost insurmountable problems aboard ship in missiles of IRBM size. For Navy purposes, the Polaris will present great advantages in simplicity, reliability, readiness, logistics, size, and overall cost.

I am pleased to report that our program is well ahead of the schedules laid out 1 year ago. For instance, we are now test firing motors which develop a thrust equal to that which we had planned to get about 2 years from now.

In the area of precise navigation—required for exact positioning of the missile-launching ship—we have demonstrated accuracies not even thought possible a year ago, and more than adequate for our minimum system requirements.

Developments in other areas which involve classified information also give us a feeling of confidence in our present schedule, tight as it is.

I am convinced that the fleet ballistic missile system is the most advanced weapon system under development in the free world today, that it will work, that it can be produced on the time schedule laid out, and that it is vital to the safety of our country.

I will be pleased to attempt to answer any questions you may wish to ask.

Admiral RABORN. My job is Director of the Special Projects Office of the Secretary of the Navy. As you know, I head up a Manhattan-type organization inside the Navy to give top-level direction and management of the Navy's highest priority program, the Polaris weapons system.

I say "weapons system" because it is composed of the missile and all of its ancillary equipment, plus the ships, and the Navy has organized a task force under my personal direction to give this kind of top-level direction to this program.

And, as such, the entire Naval Establishment and its laboratories, bureaus, and so forth, are at my command for this particular purpose.

Senator STENNIS. Pardon me. When you say "Polaris system," then you want us to understand that it includes vessels and airpower and other items, too; is that right?

Admiral RABORN. It includes everything that makes the weapon system usable. That is the missile, all of the equipment necessary to aim, guide it, and the ship or ships necessary to carry it.

As you know, Mr. Chairman, we were first the partners of the Army in a very profitable and, I think, quite pleasant and good technical partnership for a period of some 6 to 8 months, in an attempt to utilize the Jupiter missile at sea.

As we got into that program, it became quite clear that the liquid-propellant motors which the Jupiter has, presented too great a technical difficulty from the standpoint of safety, and so forth; that it was just impractical to use it at sea.

So we turned to solid propellants, and finally, as has been mentioned before, I believe by Admiral Clark, we got into the Polaris program.

Now, this is the only solid propellant ballistic missile, intermediate range ballistic missile, which we call fleet ballistic missile, in the national program. It is designed to be used specifically with ships at sea. The seagoing version of the intermediate range ballistic missile, of course, requires certain unusual characteristics not found in their land-based brethren.

We have to take care of the ship motions, the movement of the ship under the missile platform. Indeed, knowing where you are with pre-

cision on the face of the water, and in all kinds of weather, presents very unusual requirements which must be built into the weapons system as a whole.

Since starting this program and gathering together a small but extremely talented and hard-hitting group of scientists and technicians, I am very pleased to report to this committee that we have had most unusual success in making progress. We are ahead of schedule in all our developmental elements.

I must say, though, that the schedule which we set up for ourselves was arrived at after an intensive 3-month study in which the top-level scientists and technicians concerned with this program sat in concentrated study, and we evolved what has proven to be a conservative schedule.

TECHNICAL BREAKTHROUGHS PERMITTED ACCELERATION

And we are ahead of that schedule, I am very glad to say, because, as a matter of fact, we have had some most significant technical breakthroughs in all areas, which we would not have believed possible a few months ago.

As a matter of fact, we have to guard ourselves against overoptimism in this program, because from my long experience in research and development, we will come a cropper sooner or later, and we are not tooting our horn or trying to blow the bugle too loudly here. But I would like to give you the benefit of my opinions, considered opinions, in this matter.

Senator STENNIS. Well, certainly that is a very fine statement.

Are you ready to proceed, Mr. Counsel? All right, Mr. Vance.

Mr. VANCE. Admiral Raborn, you have said that the Polaris missile uses a solid propellant as opposed to liquid fuel. What are the advantages of a solid propellant as opposed to liquid fuel?

Admiral RABORN. From the Navy's point of view, and, of course, this is the only point of view which I would like to express, the principal reason is one of simplicity and safety. The solid-propellant motor is a relatively inert and solid mass of material which has all of its fuel self-contained in a dried form.

We have used solid propellants in the Navy for a period of years, as a matter of fact, generations, and we have the technical know-how in our Navy throughout to use these.

Of course, it is much more concentrated than the liquid fuels, which have to be mixed by us before or prepared just before launching the missiles; and that gives us, too, in addition to maintenance, it gives us operational readiness.

And one of the things we must have in our ships at sea is the ability to fire a missile rapidly when so directed. The ship is, of course, limited in size, and the number of missiles that you can crowd into the ship are limited, and so we want all of them to be ready all the time.

And the solid-propellant missile gives us this kind of a capability when we do get the direction.

Mr. VANCE. What are the advantages of the Polaris system? I think you have touched briefly on this in your opening statement. I thought you might want to expand on it a little.

Admiral RABORN. Well, I think that the potentialities, when we get this weapons system, are tremendous. I do believe that the sub-

marine, utilizing the world's best medium of concealment, and marrying with that an intermediate-range ballistic missile to go outside of the earth's atmosphere for travel to its target, will present to the enemy a combination that will be most difficult for him to stop.

As a matter of fact, I predict that possibly an intensive anti-submarine effort will be started, if it indeed has not already been started, by those who oppose our policies.

Mr. VANCE. When did the Navy start the Polaris program?

PROGRAM 1 YEAR OLD

Admiral RABORN. The Polaris program per se, that is, the solid-propellant Polaris program, was started just about a year ago; actually formal approval was on January 1 of this year.

Mr. VANCE. And when you got the word to go ahead and start it, how did you proceed?

Admiral RABORN. This is very unusual, and I am glad you asked that question, sir, because I think it will give the committee an insight into one of the reasons why we have made such good progress.

In spite of the urgency of this program, and all of us feel very keenly this urgency, we gathered together the best technical brains that could be applied to this program and sat down and thought our problems out in all elements, all parameters of the weapons systems as a whole, for 3 long months. This is quite difficult to do when you are under some compelling reason to move and move fast.

Mr. VANCE. Might I interrupt just a minute?

Admiral RABORN. Yes, sir.

Mr. VANCE. You said you gathered together all the best technical brains.

Admiral RABORN. Yes, sir.

Mr. VANCE. Do you mean within the service, or within and without the service?

Admiral RABORN. The best technical brains within the service and out of the service, our civilian contractors that have direct responsibilities in our program, and there have been several advisory ones, too.

Mr. VANCE. Please proceed.

Admiral RABORN. Well, there isn't much else to say, except that we thought out our problem in its entirety, and set goals for ourselves, within the time limit which we are going to allocate for the development of this system, then when we arrive there we will have an optimum missile—we will shoot for the optimum.

Mr. VANCE. Admiral, will you tell us everything you can which is not classified, with respect to the progress of the Polaris project?

Admiral RABORN. Well, that limits me considerably, but I will try.

In the several salient elements of the Polaris weapon system, let's take navigation: In order to use a ballistic missile intelligently and accurately, you must know where you are with some precision, and you must know where the target is in relation to your home launching point.

In the field of navigation, we commissioned a year ago this December the *Compass Island*, a navigation test ship. I am very glad to say the progress we have made in this past year in that navigational test ship has put us 2 years ahead, in navigational accuracy, where we thought we would be at this time.

Mr. VANCE. Is that a surface ship or a submarine?

Admiral RABORN. That is a surface ship.

In the field of solid-propellent motors, we have recently had some technological breakthroughs which have caused us again to be ahead of our schedule. As a matter of fact, as of 3 days ago, we had a most significant confirmation of one of the major elements which we have to develop to use the solid-propellent motor well.

In the field of guidance, we have taken full advantage of the fine development work in the other two services, and for instance, in the Air Force-supported advance gyro development program at MIT, the Navy has been able to work out a program from which we have received these extremely advanced gyros, and have put together an advanced-type guidance system which we are quite happy to say we feel will be a very effective one, and quite small enough to be used in the Polaris missile.

Mr. VANCE. Anything further?

Admiral RABORN. I think that covers the major parts of them.

Mr. VANCE. As I understand it, Admiral Raborn, before you started the project, you spent several months in planning the project, and it has proceeded on a schedule since that time. Can you tell us a little bit about how you are monitoring the progress as it goes along?

Admiral RABORN. Well, the same technical study group has been incorporated by the Assistant Secretary of the Navy into a technical monitoring group. They monitor the progress of our development program, set in formal session every 2 months in which they hear the progress reports and lack of progress, as the case may be, in our respective weapons-system elements.

Mr. VANCE. I am not quite sure who sits in on these conferences. Would you please amplify?

Admiral RABORN. Yes, I will be glad to, Mr. Vance.

The leading technical people in the civilian contractors, MIT, Dr. Stark Draper, General Electric Co., Lockheed, Aerojet, General, Atomic Energy Commission, chief designer of the Bureau of Ships, two representatives of the customer, the Chief of Naval Operations, and my own technical staff, compose this technical guidance group, and they not only have a definite responsibility for individual elements of the weapons system, but give us their advice across the board. And, of course, by cross-fertilization of ideas, we have had extremely good success with this system.

Mr. VANCE. Is this satisfactory to the contractors? Do they feel they are being monitored too much, or did this speed up the program?

Admiral RABORN. They feel this speeds up the program, because we get decisions made on the spot in which they participate and then they go back and implement them.

Mr. VANCE. Now, is there any connection or cooperation between the Navy and the other services in connection with your program?

Admiral RABORN. I am very glad to say that this is true. We have the highest kind of cooperation between the Army, the Air Force, and the Navy. As you know, General Medaris and I were partners for a period of over 8 months. We developed a close working relationship between ourselves, and also between our technical staffs.

I think so much of the Air Force ballistic-missile program that I loaded my entire technical staff in a Navy airplane and went out to General Schriever's headquarters and spent 2 full days reviewing our

programs and theirs, and getting on a first-name basis between our respective technical groups.

This has paid off, and paid off handsomely.

Mr. VANCE. Is there any program for the actual exchange of information so that you are sure you get it as soon as possible?

Admiral RABORN. Oh, yes, indeed.

Mr. VANCE. How does it work?

Admiral RABORN. I have officers on duty at General Medaris' and General Schriever's headquarters. We exchange information as a matter of routine on all reports of our respective technical matters.

Mr. VANCE. Have you been able to get any information from them which speeded up your program?

Admiral RABORN. Oh, yes, sir; we certainly have.

Mr. VANCE. Will you tell us what it is?

Admiral RABORN. I say we helped them, too?

Mr. VANCE. Could you tell us what they are?

Admiral RABORN. In general terms, because it is sensitive and classified, Mr. Vance.

For instance, the technical advances in an Air Force gyro project at MIT which, incidentally, was an old Navy contract which we got too poor to handle, and the Air Force took it over for us. I have told you about the small gyros which we are using on our missile system, guidance; the exchange of technical information which we have had with the Army and our warhead work, as well as the Air Force, has caused us to, I think, move along faster than we would normally.

As a matter of fact, I can say categorically that the Navy, coming a little later behind the other two intermediate-range ballistic missiles, has been able to move much faster than they normally would have because of the fine progress those two services have made in this field.

Mr. VANCE. I gather, Admiral, that your program has been accelerated by certain technical breakthroughs which you have been able to make sooner than you thought you could. Could your program be accelerated any faster than it is now going?

Admiral RABORN. Yes, sir.

Mr. VANCE. Have you made any such recommendations?

Admiral RABORN. They have been, and they have been bought. We are doing it.

Mr. VANCE. And is it going as fast as you think it can now, or do you have recommendations for further acceleration?

PROGRESS AT FAST PACE

Admiral RABORN. We were at a dead run; we are now at a full gallop. I don't think we can run any faster without falling on our face.

Mr. VANCE. Have you received all the funds you need to proceed at this pace?

Admiral RABORN. Yes, sir.

Mr. VANCE. And you have them in hand?

Admiral RABORN. I beg your pardon?

Mr. VANCE. And you have them in hand?

Admiral RABORN. Yes, sir. I am not being impeded by lack of funds at the moment. We have a very expensive program, I must say, and I probably will be back later for my handout.

Mr. VANCE. Admiral, where did those funds come from?

Admiral RABORN. The funds are, of course, obtained in normal fashion from the Congress.

Mr. VANCE. No; but I mean where did you get them from? They came from the Congress originally. Did they come out of a budget that was set aside for Polaris, or did you have to borrow it from some other accounts in the Navy?

Admiral RABORN. Well, the nature of this program, Mr. Vance, is that we have been moving very fast, and making unusual demands on the finances of the Navy.

Basically, however, I appear before the Congress to justify funds in several naval appropriations, to support this program. Additional funds which we have found necessary to keep up with the technical advances, I have made requests on the Secretary of the Navy, and he has granted them.

Mr. VANCE. And you have actually gotten all the funds that you have asked for?

Admiral RABORN. Yes, sir.

Mr. VANCE. Do you have any administrative obstacles?

Admiral RABORN. I think any administrative procedures at all, except "Here's the money, go to it," are obstacles.

Senator STENNIS. Are what?

Admiral RABORN. I said any procedure, Mr. Chairman, except, "Here is the money, and go do it and come back with a finished article," is an obstacle to a man who is in a hurry. We are in a hurry.

Mr. VANCE. Well, now, Admiral, specifically, do you have any funding system problems?

Admiral RABORN. Yes, sir, I have. I have made recommendations, which I am very glad to say that Mr. McNeil—

Mr. VANCE. Just a second, Admiral. What are the funding system problems?

Admiral RABORN. The funding system problems which we have encountered are basically that which requires us to have money in several appropriation pockets, and because of the laws established by the Congress, we have some inability to move them from one appropriation to another to take care of the demands on the program as we will go on.

Mr. VANCE. Now, as a matter of fact, you have them in six different appropriation accounts; don't you?

Admiral RABORN. Five. I think we will get them reduced this year.

Mr. VANCE. Hasn't that presented a problem which has impeded the flexibility of your program and taken a good deal of your time and that of your personnel, and slowed down the program in that way?

Admiral RABORN. It has caused us some inconvenience and effort which I would like not to have put into it.

I have taken steps to, I believe, largely alleviate this matter, with the full cooperation of the Secretary of Defense and his Comptroller, Mr. McNeil.

Mr. VANCE. What are the steps you have taken, please, Admiral?

Admiral RABORN. Mr. McNeil had established, I believe in 1946 or thereabouts, what is called a management fund.

Mr. VANCE. I am sorry; I didn't hear you.

Admiral RABORN. A management fund.

Now, Mr. McNeil feels that if we utilize the management-fund technique, this will alleviate a great deal of the problems which have confronted us this past year. This matter is in the process of discussion between the two Comptrollers; and from my knowledge of it, I believe that this will largely smooth this matter out.

Mr. VANCE. Admiral, I am afraid I don't quite understand that. Would you expand a little bit?

Admiral RABORN. Well, for instance, when the DEW line was built, we had several services participating with a lot of appropriations, so Mr. McNeil sought from the Congress, and received, permission to establish what is known as a management fund, that is, in the Department of Defense.

Mr. VANCE. What is a management fund?

Admiral RABORN. It is a fund in which the money coming from several sources is put into broad categories. It allows considerable latitude in letting the contract. The fund manager merely estimates his funding requirements and goes ahead and gets his contracts signed like that.

Mr. VANCE. Who is the fund manager in your case?

Admiral RABORN. I have—this has not been decided. I have been told if this is put into effect, that I will be it.

Mr. VANCE. You, rather than Mr. McNeil?

Admiral RABORN. Oh, yes. It has to be in a service.

Mr. VANCE. And this has been recommended, but no action has been taken on it yet?

Admiral RABORN. No final action has been taken. It is under discussion between the Navy Comptroller and Mr. McNeil.

Mr. VANCE. This will do away with the problem, in your view, of having these different appropriation accounts?

Admiral RABORN. Largely alleviate them; yes, sir, Mr. Vance.

Mr. VANCE. What other bottlenecks, if any, have you found in your program?

Admiral RABORN. In what respect, technical or otherwise?

Mr. VANCE. Nontechnical, something that this committee could help you with.

Admiral RABORN. I don't think of any, Mr. Vance, offhand.

Mr. VANCE. Then as I understand it, it is your testimony that you have all the money you want, you have all the men you want, and there is nothing that this committee can do to help you to speed up your program?

Admiral RABORN. Well, I would like to say this, Mr. Vance: No person who is in charge of the highest priority type of program is happy or satisfied with everything that he has. I certainly am not, and I don't want to leave the impression that I am.

I am a man with some considerable experience in the Navy as well as research and development, as well as the operational field. I recognize the need for other matters in addition to the Polaris program to be prosecuted.

If I had my way about it, which might be silly, actually I would have a complete backup in every department. I have, however, tried to conservatively fund this program, and to give it good management. You can do a lot with good management instead of just spending a lot of money. I have had no trouble with obtaining personnel, the Navy has been very gracious about allowing me to take my pick of the best technical people in the Navy, and I must say that the Navy has some fine technical people. There are none better, in my opinion. The civilian personnel who are attracted to our program are principally attracted by sincere desire on their part to further its (the Polaris) progress, recognizing the tremendous potential which it has in the defense of our country.

So, while I cannot say that I have to have so many extra million dollars and so many extra people and so many this and that, I can say this: If I need them, I am going to holler for them.

Mr. VANCE. Admiral, do you think you are going to meet your target dates for completion of the program?

Admiral RABORN. Yes, sir.

Mr. VANCE. As I understand it, you will need submarines as well as missiles. If you can properly answer me without going into classified information, have you started on the program of getting the submarines built? Do not answer it if I have gone into anything I should not have touched on. If you would rather answer in closed session, that is all right.

Admiral RABORN. No. I can answer that one. I am very glad to answer it. I am responsible for the military features of that submarine just as much as I am for the missile; and from the word "go" we have been running just as fast on the design of that submarine as we have on the missile because we must make progress in concert, together, and so from the first day that we were organized, we have been developing the features, the salient features of that submarine; and I am very glad to say that we are up to schedule in that.

Mr. VANCE. In other words, as I understand it, you are in the design stage at this point?

Do not answer that if I have gone too far.

Then finally, Admiral, as I gather it, there is nothing at this time that you feel this committee can do to help you accelerate your program. You have said that if something comes up in the future, you will come and say you want it. Right now there is nothing that this committee can do to help?

Admiral BURKE. May I answer that?

Mr. VANCE. Yes, indeed, Admiral.

Admiral BURKE. Admiral Raborn has been discussing the technical progress of the first submarine and the first missile suit, and that is coming along very well. He is quite correct in that there is no restriction on money or people. He has a blank check. He is the only man in the Navy that has a blank check. When we cash his check, we pull the men, we pull the scientists, the scientific offices in other projects if he wants them. All he has to do is say, "I want them," and he gets them.

The same thing happens on money, because we realize the importance of this very fine weapons system, so, in effect, it does have an effect, a big effect, on other systems.

Now, as far as what can we get, what do we need in addition, it is going to depend a good deal upon whether Admiral Raborn is going to be able to make a breakthrough, and he has made a good many so far. If he makes a breakthrough, we are going to need to speed this thing up fast in order to take advantage of the breakthroughs, and he will get the money. We will take it from something else if we have to.

Now, that is for the first submarine, the first operational complete weapons system. Beyond that we need more than one submarine weapons system. It is a little too early yet to determine how much money we are going to need, how fast we are going to need those. But we are going to need at least more than one, several of them.

Senator SALTONSTALL. Mr. Chairman, would the counsel be willing to yield on a question?

Mr. VANCE. Yes, indeed, Senator.

Senator SALTONSTALL. I thank you, Mr. Vance.

What I would like to know is this, Admiral Burke. We authorized a certain number of new submarines in the next year to be built, did we not?

Admiral BURKE. In the 1958 program?

Senator SALTONSTALL. Yes.

Admiral BURKE. That is right.

Senator SALTONSTALL. My question is: Is any one of those submarines being held up in such a way so that if there is this breakthrough, then there will be a ship under construction that will be available to take advantage of the breakthrough?

Admiral BURKE. I am not sure I have it quite clear.

Senator SALTONSTALL. Well, we authorized and appropriated money for a certain number of new submarines. I forget the exact amount.

Admiral BURKE. Yes, sir.

MATING SUBS FOR POLARIS TO BE REQUESTED

Senator SALTONSTALL. Now, my question is: Will one of those submarines, if there is a breakthrough by Admiral Raborn, be available for establishing this system that you are talking about?

Admiral BURKE. No, sir, none of those submarines were Polaris submarines, sir, because last year when we submitted our shipbuilding requirements, we did not believe that we would have such success in our Polaris system as we have had; so the submarines that we are going to have to get or the submarines we are talking about for Polaris are submarines that will be in the next shipbuilding, sir, or a supplemental or some other shipbuilding.

Senator SALTONSTALL. Thank you, Mr. Vance.

Mr. VANCE. I just have one more question. I believe you said, Admiral Burke, that, in effect, Admiral Raborn had been given a blank check to go ahead on this program. Was that decision made back at the start of the program in 1955 or the beginning of 1956?

Admiral BURKE. At the beginning of 1956, so long as he made rapid progress and did not abuse the blank check privilege, yes, sir.

Mr. VANCE. Thank you very much, sir. I have no further questions, Mr. Chairman.

Senator STENNIS. Admiral, your representations here and your exuberance, optimism, are very helpful and reassuring. I certainly wish you well in continuing in this very fine project which offers much hope and prospect.

I have here before me an advertisement that appeared in the Monday, December the 9th issue of newspapers. About two-thirds of it is a picture of a submerged submarine with a missile in flight. Inserted in that picture is the submarine, presumably on the bottom of the ocean, and it makes this statement in writing:

From a hidden site deep in the ocean 1,500-mile Polaris missile can be shot to the surface and hurtled through space at tremendous speeds. Hard to detect, mobile launching sites make defense against Polaris practically impossible.

I have been out in the areas where the people are deeply concerned about what the prospects are for the future with reference to missiles, antimissiles and weapons.

Is that a true statement here that I read from this advertisement? It says:

From a hidden site deep in the ocean 1,500-mile Polaris missile can be shot to the surface—

present tense—

can be shot to the surface and hurtled through space. Hard to detect, mobile launching sites make defense against Polaris practically impossible.

Is that a true statement?

Admiral RABORN. Just one thing wrong with it. We have yet to do it.

Senator STENNIS. So it is just not true, is it, so far as protection to the American people now?

Admiral RABORN. That is correct.

Senator STENNIS. All right; the second statement:

Navy's ballistic missile—

now, this is not signed by the Navy. This is signed by General Electric. The second statement:

Navy's ballistic missile can pinpoint targets 1,500 miles from submarine.

Is that true or false?

Admiral RABORN. The same statement holds, Mr. Chairman.

Senator STENNIS. The third statement here is:

Polaris—the United States Navy's new fleet ballistic missile system—now under development gives your Navy a fast, mobile hidden striking force capable of hitting any strategic target from a submerged submarine.

Now, that clause "now under development" does qualify all the rest, and gives it the idea of speaking of the future. It is the only clause I find in this entire advertisement that puts the reader on any warning whatsoever that the future is referred to. The rest of it is factual. I want to put it all in the record, though.

The next one:

In case of enemy attack, atomic-powered submarines armed with Polaris missiles could strike a devastating retaliatory blow from anywhere in the vast expanses of ocean that cover nearly three-fourths of the earth's surface.

That is not true; is it?

Admiral RABORN. It certainly is not at present.

Senator STENNIS (reading) :

The launching site for this atomic weapon will be mobile and hard to find. It will be a submerged atomic-powered submarine capable of operating under water around the world and hidden anywhere in the oceans depth. With this mobility, the Navy is able to operate close to any shore, ready for instant retaliation.

There is a slight futurity on the part of that paragraph, but most of it seems to be factual, and so far as its being factual now, it is not true, is it?

Admiral RABORN. That is right.

Senator STENNIS (reading) :

Typical of the problems being solved in perfecting the Polaris missile are intricate guidance and fire-control system being developed by the United States Navy, the Massachusetts Institute of Technology and the General Electric Co.

I think a careful reading of that would show that it is referring to the future.

With Polaris the Navy adds ballistic seapower from the hidden depth of the ocean to its traditional advantages of speed, mobility, and long-range in helping defend America.

Now, that word "adds" is present tense "In helping defend America," so that statement is not true either; is it?

Admiral RABORN. It certainly is not.

Senator STENNIS. So would it be fair to say that this advertisement here is highly misleading to the people that might read it?

Admiral RABORN. I believe that is a correct statement.

Senator STENNIS. Did the Navy approve of this advertisement before it was used? They used your name here so much that I thought maybe they had to submit these matters to you. Do they?

Admiral RABORN. They have not submitted that, of course, through my office.

Senator STENNIS. You know nothing about this?

Admiral RABORN. No, sir. I believe their ad writer kind of ran away with himself there.

Senator STENNIS. So far as you know, why, these matters do not have to be submitted to the Navy for approval or for comment, is that correct? Admiral Burke, can you answer that?

SUSPECTS IT WAS SUBMITTED

Admiral BURKE. I am not sure in this particular instance that that was submitted to the Navy, but I would suspect it probably was, and I would think that it probably also was submitted to the Secretary of Defense's Office of Public Affairs.

Senator STENNIS. Admiral Burke, if it was submitted to the Navy, how in the world could you justify such statements as that being put out before the American public when it takes a rather close and careful reading to detect the slightest bit of futuristic application?

Admiral BURKE. I agree that the advertisement there should have been couched more in future language. Still there is a good deal of truth in that, too, sir, that it is, will be a wonderful weapon when it is developed.

Now, they should have emphasized the development more. I agree with you about the impression that it gives.

Senator STENNIS. That is the very point. These statements here lead people to believe that those conditions exist now, and that these are actualities.

Admiral BURKE. To that extent——

Senator STENNIS. Or that at least they will soon be completed and ready for action. I think with all deference to whoever prepared it or whoever approved it by the Navy, I think it is largely false. I know it is highly misleading, and I do not think the Navy ought to put its approval in any way upon a statement of that kind.

Admiral BURKE. I am not positive that we did, but I would suspect that we did.

Senator STENNIS. I think we ought to have some assurances here that the Navy will give more attention. I understand that they do have to come to you for approval.

Admiral BURKE. They probably do; yes.

Senator STENNIS. Is there any chance of getting assurances here that there will be a tightening up on such wording as in those paragraphs there?

Admiral BURKE. Yes, sir; we will tighten it up.

Senator STENNIS. Do you not think it should be?

Admiral BURKE. Yes, sir; I agree with you on this particular statement. But on the other hand, that is a wonderful weapon. It does give the United States great advantages, and it will provide a tremendous thing for the United States when it is fully developed. There should have been more emphasis on the fact that it is under development now.

Senator STENNIS. Of course, it is a great weapon and we are very proud of it. We want the Navy to get all the credit for it and General Electric Co. too; and I like to see the companies advertise for the benefit of the people's information.

My sole point is that it is highly misleading and it uses your name to lend official sanction, it seems to me, and just such things as this—it is just not fair to them and it gives them a buildup and then a let-down, and they are entitled to the unvarnished truth rather than a varnished version of what we hope will be the truth some time in the future.

Admiral, you say you are ahead of schedule now. As I have understood here, last spring your schedule was that you were going to make the final formulation of your propellents involved in this matter by some time this early fall. Was that your schedule and have you made those selections, for instance?

Admiral RABORN. Yes, sir; we have successfully proved them out.

Senator STENNIS. When did you get that done, sometime recently?

Admiral RABORN. If I may, I will give that information in classified session.

Senator STENNIS. That is all right if you prefer that. About the nuclear submarine, you say you have control of the submarine as well as the missile part of the program?

Admiral RABORN. Yes, sir; control of the weapons system part of the submarine, which is everything that has to do with Polaris.

Senator STENNIS. I thought you said that you had control of the operation of the submarine, fitting the submarine to your missile pro-

gram and all. Have you conferred with Admiral Rickover about the submarine part of it?

Admiral RABORN. The Chief of the Bureau of Ships is the direct representative of that Bureau for matters pertaining to the Polaris program.

Senator STENNIS. Have you conferred with him?

Admiral RABORN. I have conferred with him, yes. I had a very long talk with him when I first took this job.

Senator STENNIS. I thank you. My time is up.

Senator BRIDGES.

Senator BRIDGES. We have been told that one of the reasons the Russians got the jump on us on the intercontinental missile is the fact that they started its development immediately even before they had the warhead perfected small enough to use, while we waited until we perfected the warhead before we started in earnest on the missile. I am just wondering if you are making the progress you should on this missile unless simultaneously work is going forward on the submarine from which it is to be launched?

Admiral RABORN. Work is going on, on the submarine. This is also under my supervision. I am carrying it on in concert, in unison with the missile work.

Senator BRIDGES. You have not actually started to build the submarine have you?

Admiral RABORN. It is on schedule where it should be, Senator.

Senator BRIDGES. So that by the time you get the missile perfected, you will have the ship from which to fire it?

Admiral RABORN. Yes, sir, we surely will.

Senator BRIDGES. Thank you.

Senator STENNIS. Senator Symington.

Senator SYMINGTON. Admiral, you mentioned Stark Draper. He is working with you. Is that correct?

Admiral RABORN. Yes, sir.

Senator SYMINGTON. In my last job in private business he and I were together. Will you give him my regards?

Admiral RABORN. Thank you, sir, I will.

Senator SYMINGTON. To the best of my knowledge I have no stock in the General Electric Co., but you would not want to say that anybody would put an advertisement out like this which was not approved by the Department of Defense, would you?

Admiral RABORN. That is outside of my field, Mr. Symington. I am afraid I am not competent to speak on that.

Senator SYMINGTON. The record should show that on December 11, 1957, in the Washington Star, Murray Snyder, Assistant Secretary for Public Affairs—

Said today that no new directive had been issued, but that the old rules were being reemphasized. He said every advertisement is being screened "for fact and the impression that is created." He added, "We want to see that the story is accurately and fairly set forth as to the state of the products' development and performance."

You would not want to say that he was not giving the facts, would you?

Admiral BURKE. May I take that, sir?

Senator SYMINGTON. Yes, Admiral.

Admiral BURKE. I am sure that the responsibility for approving that advertising rests on the Navy's shoulders. I am sure if that were approved by the Secretary of Defense, and it probably was, that he did it upon our advice; so I think it is our responsibility and I would not like to send it up to Mr. Snyder, sir.

Senator SYMINGTON. I said the Department of Defense.

Admiral BURKE. Yes, sir.

Senator SYMINGTON. My only point was I think it is fair to the manufacturer that the principle, the policy is not to issue an advertisement like this unless it is first cleared; is that right?

Admiral BURKE. Yes, sir; that is correct, sir.

Senator SYMINGTON. Now, you mentioned that this will be a great weapon for us. Have we any submarines yet that can fire this weapon, Admiral?

Admiral RABORN. No, sir. We are keeping its development in step with the missile.

Senator SYMINGTON. If we have one that can fire it, the chances are the Russians might have one, too; is that right?

Admiral RABORN. In this field, if I give you an answer, Senator, it will be purely a conjecture. I would like to defer to experts.

Senator SYMINGTON. If it is purely conjecture, I do not see why it has to be classified.

Admiral RABORN. No. But I think it would not be worthwhile.

Senator SYMINGTON. But you would not say that the recent weeks and months show that we can do things the Soviets cannot in this field, would you?

Admiral RABORN. I would say it would be very dangerous to assume so, Mr. Symington.

Senator SYMINGTON. How many submarines did we say they had?

Admiral RABORN. I believe it was testified in the neighborhood of 500, sir.

Senator SYMINGTON. And how many have we?

Admiral BURKE. 110, sir.

Senator SYMINGTON. When you do not use lox and use a solid propellant, do you also take the position that the Polaris is a 1,500-mile missile?

Admiral RABORN. Yes, sir; we are.

Senator SYMINGTON. Do you believe that yourself?

Admiral RABORN. I am under oath, Senator.

Senator SYMINGTON. I know.

Admiral RABORN. Our plans call for the Polaris being a 1,500-mile missile. This does not mean that the first time we fire it, it will go 1,500 miles. It just means that at this stage, at that stage of the development, it may be less or it may be more. Our plans—

Senator SYMINGTON. May I pursue this subject with you in executive session?

Admiral RABORN. I will be glad to.

Senator SYMINGTON. The third stage of Vanguard is a solid propellant, is it not?

Admiral RABORN. I believe that is correct, sir.

Senator SYMINGTON. But that has nothing to do with what we are talking about?

Admiral RABORN. No, sir.

Senator SYMINGTON. You talked about this management fund. That interests me. Is that a revolving fund?

Admiral RABORN. The only revolving fund I have heard is one Sears, Roebuck uses and I am not too well acquainted with that; but I think possibly I can say this—

Senator SYMINGTON. You do not want to put missiles in the Sears' catalog, do you?

Admiral RABORN. No, sir. My understanding of this, and I have just had some conversations and some deep study of it in the last few weeks, it is something which we give an accounting of, our stewardship of it on a monthly basis. This is principally fiscal accounting which I would do in my own office.

Also, as the rules are set up now, this fund would elapse at the end of the fiscal year and we could have papers all set ready to process and have immediate approval and then there would be no stopping us from work, no stoppage of the availability of funds.

Senator SYMINGTON. How does the management fund appear in the budget?

Admiral RABORN. This management fund would not appear in the budget per se as I understand it. We would justify our moneys in the normal appropriations but there would be language in the appropriations which would permit this transfer to the management fund.

Senator SYMINGTON. I beg your pardon.

Admiral RABORN. There would be language in the appropriation which would permit us to transfer to the management fund after the Congress had acted upon the request.

Senator SYMINGTON. Do you know where that language is in the budget request? I don't know about it.

Admiral RABORN. No, we don't because we have requested it at this time. For the Polaris it has been used—

Senator SYMINGTON. In other words, you have a blank check, but you have no money in the bank, is that correct, seriously?

Admiral RABORN. Well—

Senator SYMINGTON. How can you transfer it if you have not it to transfer?

Admiral RABORN. I have money now in the normal appropriations.

Senator SYMINGTON. In the normal appropriations?

Admiral RABORN. Yes, sir.

Senator SYMINGTON. So the blank check is for any additional money you might need; is that right?

Admiral RABORN. Yes, sir.

Senator SYMINGTON. Well, now, you see what is in my mind. Down here we like to know what we put the money up for. I am glad to see your very able and distinguished Secretary, and think he knows what I am driving at, being an ex-money man himself.

Are you just swinging this money around to take care of that particular priority in the Navy you think is the one you would like to handle? That would be the first question.

The second, if you do that, don't you do it at the expense of some other program or don't you just ask and receive, what we would call on a balance sheet, miscellaneous items?

Secretary GATES. Senator Symington, you may recall that this is the way the Spanish-base program was financed.

This is a financial method approved by the Congress in the language of the appropriation bill as to who handles funds and gives a flexibility of transferability of a special project within that management fund, requiring an accounting and justification after the fact.

Senator SYMINGTON. Is there any language here comparable to what happened on the Spanish bases, now in the appropriation funds for the Polaris?

Secretary GATES. No, sir. This would have to be established in 1958 budget or established with the approval of the Congress when we set it up, I believe.

Senator SYMINGTON. Suppose the Congress did not approve it, and you had spent the money. What would happen then?

Secretary GATES. We would not have spent the money this way, because presently we would be spending money that is in about four appropriations; so we would just be spending it under the present system rather than financing it through the proposed management fund.

There are 2 or 3 ways this can be done.

This has not been decided yet. The purpose is not to take money you have not got. The purpose is to make it easier for Admiral Raborn to do his business. I would think a single appropriation for Polaris should do it.

Senator SYMINGTON. I think it probably a good idea to do it, but am trying to find out where the money is coming from; because if you don't need the management fund and can take it from somewhere else, why do you ask for it on the basis of a revolving fund?

Secretary GATES. I think it would be simpler for him, in the Navy, to do it under a management fund than under a single appropriation.

Senator SYMINGTON. What was the date you decided you were going to give the blank check to Polaris?

BLANK CHECK ON POLARIS FROM START

Secretary GATES. I think that Polaris on its original schedule had a blank check from the beginning, sir.

Senator SYMINGTON. I see.

Secretary GATES. In its original schedule.

Senator SYMINGTON. In other words, from the Navy standpoint it is not a postsputnik operation in any sense.

Secretary GATES. Well, the plans to accelerate have been developing including postsputnik.

Senator SYMINGTON. Yes.

Secretary GATES. But the blank check No. 1 part of the Polaris has been in from its kickoff.

Senator SYMINGTON. There is one missile I know of where there has been a lot of emphasis by people high in Government. It is not a ballistic missile. Its production has just been cut 50 percent; so I am wondering when the Polaris acceleration happened.

Secretary GATES. It has been a No. 1 priority since it was an approved project within the Navy, Senator Symington.

Senator SYMINGTON. And that means—

Secretary GATES. All that has happened is that the tests have proven out better as we progressed and the ability to accelerate, has improved, I think three times.

Senator SYMINGTON. I am running near the end of my time.

Except for the change in policy, which really did not involve any change in money, incident to payment of contractors, and except for the 10 percent on research and development taken away in August and put back in November, do you know of anything, outside of the missile field, in the way of a directive or an order for approval from the Bureau of the Budget and the Department of Defense which replaces the reductions made in the Navy since the first of the calendar year 1957. If so, what?

Secretary GATES. You are addressing it to me, Senator?

Senator SYMINGTON. Yes, sir; if you would like to answer it. I would be glad to address it to anybody.

Secretary GATES. To the best of my knowledge.

In addition to the items you have mentioned, there has been a change in the expenditure ceiling that heretofore was in existence in the Department of Defense for both the Air Force and the Navy in terms of the year end, calendar year end and the fiscal year end.

There has been relief granted to both services in connection with the expenditure ceiling.

Senator SYMINGTON. Does that include something beyond the research and development?

Secretary GATES. Yes, sir.

Senator SYMINGTON. And replacement and procurement replacement?

Secretary GATES. Yes, I believe it does.

Senator SYMINGTON. Do you know what it is?

Secretary GATES. Well, I know what the dollars are but I don't know exactly the programs.

Senator SYMINGTON. What were the dollars?

Secretary GATES. The dollars for the Navy to the best of my recollection were \$300 million.

Senator SYMINGTON. And for the Navy \$300 million additional has been added to the rigid expenditure of \$38 billion?

Secretary GATES. Yes, sir.

Senator SYMINGTON. Where does that \$300 million apply?

Secretary GATES. It will apply principally to—our case where we were in trouble was in the aircraft procurement.

Senator SYMINGTON. Thank you, Mr. Chairman.

Senator STENNIS. Thank you, Senator.

Senator SALTONSTALL?

Senator SALTONSTALL. Mr. Chairman, just one question to Admiral Burke.

Admiral Burke, may I ask you this one question: With respect to what Admiral Raborn said about the breakthrough in Polaris would it not be well to keep one of these new submarines which has already been authorized and appropriated available so if there is a further breakthrough there would be no delay in building the ship?

Admiral BURKE. No, sir; the types of ships are such there would be nothing to be gained.

The ship has to be designed from the keel up and it would cost more and probably take more time to convert a submarine than it

would be to proceed with a new ship according to the regular design.

Senator STENNIS. Senator Flanders?

Senator FLANDERS. Admiral Raborn, if I understood you, you spoke of this monitoring group as being incorporated.

Did you mean incorporated in the strict sense of the word that it is a limited-liability corporation?

Admiral RABORN. No, Senator, I did not. I mean that they, as responsible officials of companies and of laboratories who have a direct development responsibility to the program as a whole, have joined with us in their efforts to give top-level direction on this fast-moving program.

Senator FLANDERS. What I am really getting at is to find out whether you have a contract with this group.

Admiral RABORN. We have a contract with them for their part of the program, but not per se for the technical direction in joiner.

Senator FLANDERS. Then what are the resemblances and what are the differences in your relationship with this group as compared with the relationships of the Air Force with the Ramo-Wooldridge group?

We have arrived at our destination?

Admiral RABORN. The relations of this group are considerably different to the Navy than that of the Ramo-Wooldridge Corp. to the Air Force. The Navy, having a wide and deep reservoir of highly trained and technical-skilled personnel, particularly in this type of ballistic missile, has drawn for themselves the necessary extra skills to do the job.

We have a Polaris missile-system contractor. The missile itself, that is the Lockheed Aircraft Corp., the missile division.

They furnish not only the skills to build that missile and to give the necessary direction to their subcontractors, for the motor, for the guidance, and to the Atomic Energy Commission for the warhead, but they also provide technical advice on this steering committee that I mentioned.

Does this answer your question, sir?

Senator FLANDERS. I do not see then that there is any likeness to the Air Force Ramo-Wooldridge connection.

Admiral RABORN. That is correct, sir.

Senator FLANDERS. All right.

Thank you; that is all, Mr. Chairman.

Senator STENNIS. Thank you, Senator.

Senator Bush?

Senator BUSH. I have no questions, sir.

Senator STENNIS. Senator Barrett?

Senator BARRETT. Admiral Raborn, would the Polaris be a missile that could be substituted for the Thor or the Jupiter?

Admiral RABORN. We have not proved it out yet, sir, so that is a little difficult to say. The Polaris, because it must be used aboard ship at sea in a sea environment, is considerably more sophisticated in many ways than that required for use land-based. It has to be.

If you were building a missile of this kind for land-based use you probably would not put this extra added sophistication in it because it would cost extra money and you would not need it.

Senator BARRETT. Would that mean then that it would make it more expensive or less desirable?

Admiral RABORN. I think it would make it more expensive, certainly not less desirable.

Senator BARRETT. Tell me this, the Defense Department has established a priority for the Atlas, the Thor, and the Jupiter. Does the Polaris have the same high degree of priority as these other three missiles?

Admiral RABORN. Yes, sir; we have coequal No. 1 priority.

Senator BARRETT. Did I understand you to say that in your judgment the Polaris was more advanced and a better missile than the other two IRBM's?

Admiral RABORN. Let's put it this way, Mr. Senator.

Without casting aspersions on the other fine missiles, we started a little later than them, and because of this, we were able to take advantage of the state, and advances of the state of art on both the Thor and Jupiter. If they started building the Thor and the Jupiter today they would be better missiles because of this fact.

Senator BARRETT. It is not fair then to state that the difference between the Thor, the Jupiter, and the Polaris is the propellant; there are other substantial differences?

Admiral RABORN. Yes, sir; there are other substantial differences.

Senator BARRETT. That is all, Mr. Chairman.

Senator STENNIS. Thank you very much, Admiral.

We thank you very much for your statement here, Admiral, and we feel you have been very helpful.

Admiral RABORN. Thank you.

Senator STENNIS. Our next witness has been called before the committee to shed some light on management problems on the missile program. He is Dr. J. Sterling Livingston, who teaches a course in military management in Harvard Business School and is president of Harbridge House, Inc., a management consulting and training organization.

Dr. Livingston has made a special study of the problem of management in weapons development, lead time, and weapons systems. He has had production experience in defense procurement and has worked closely with the military services.

Dr. Livingston, as I understand it, is in the room. Will you come around, please? All right, Dr. Livingston, in keeping with the practice of the committee, will you raise your right hand and be sworn.

Do you solemnly swear your testimony here before the subcommittee will be the truth, the whole truth, and nothing but the truth, so help you God?

Dr. LIVINGSTON. I do.

(The biography of Dr. Livingston is as follows:)

J. STERLING LIVINGSTON

Dr. J. Sterling Livingston teaches a course in military management at Harvard Business School.

Dr. Livingston was born in Salt Lake City, Utah, in 1916. He attended the University of Southern California from which he received a bachelor of science degree in business administration in 1938. He subsequently obtained the degrees of master of business administration and doctor of commercial science at Harvard University.

In 1941 Dr. Livingston was a consultant to the Chairman of the War Production Board. In 1942 he was called to active duty in the Navy Supply Corps and subsequently rose to the rank of commander.

Following the war he prepared his doctoral thesis on problems of quality determination in naval procurement. In 1946 he became an assistant professor of business administration at the Harvard Business School.

At the outbreak of the Korean war he served as consultant to the Chief of Naval Material and at that time developed a program to reduce procurement lead time in the Bureaus of Aeronautics, Ordnance, and Ships. Since the Korean war he has worked closely with the military services in training contracting officers and developing procurement and supply policies.

For the past 2 years he has studied problems of military organization in connection with his military management course at the Harvard Business School, giving particular attention to weapons development lead time and weapons systems management.

STATEMENT OF J. STERLING LIVINGSTON, PROFESSOR OF BUSINESS ADMINISTRATION, HARVARD UNIVERSITY

Senator STENNIS. Let us have quiet, if we may. We appreciate the fact here this floor is not arranged where the audience or even the press can have very much chance to see and hear, but let us do the best we can with what we have. Anyone who wants to move forward may do so, but after we get started, let us please be quiet. And except the photographers, why, please be still.

Are you ready, Doctor, to proceed now?

Mr. WEISL. Dr. Livingston, at the first session of the committee, Senator Johnson stated that the United States was ahead in past weapons but behind in future weapons. It was for that reason, as well as for others, that we asked you to testify as to why that condition exists. So if you will in your own way proceed to tell this committee why, in your opinion, it takes the United States twice as long to manufacture a weapon as it does the Soviet Union, we will all appreciate it.

Dr. LIVINGSTON. Thank you, Mr. Counsel.

As I understand it, Mr. Chairman, among the purposes of this investigation is the determination of, first, why we have lost our commanding technological lead in weapons development; second, whether we will fall further behind in the development of future weapons; third, why we have consistently underestimated the progress of the Soviets; and, fourth, what this Nation must do to regain undisputed technological leadership and weapons superiority.

Mr. Chairman, following as I do the group of distinguished men who have testified before this committee, it is with trepidation that I offer my answer to these questions. It is also with reluctance and great humility that I question whether the basic problem has yet been defined. Interservice rivalry, inadequate scientific advice, insufficient funds for weapons research, and the shortage of scientific and engineering personnel have all contributed to the problem, but they have not, in my opinion, been primarily responsible for our loss of weapons superiority.

ARMY SCIENTIFIC ADVISORY PANEL STUDY

What, then, is our major problem? For an explanation of the basic problem I should like to refer to the analysis of a group of distinguished scientists. The Army Scientific Advisory Panel. As you know, this group was headed by Dr. Killian; its present chairman is Dr. Frederick L. Hovey. Less than 6 weeks ago, Dr. Hovey, on behalf of the Panel, wrote a letter to Secretary of the Army Brucker

outlining the basic problem. May I read a portion of that letter to you? It begins:

The application of science to warfare has reached the stage where the principal guaranty of national security in the years ahead is the maintenance of scientific and technological superiority * * * The problem before the Nation is not simply one of money, facilities nor even men—those we have in substantial amounts, and that which we do not have can be provided. Whatever the failures may be, they are primarily those of management—which result in delays in decision making and confusion in the direction of our technological forces.

May I read that last sentence again?

Whatever the failures may be, they are primarily those of management—which result in delays in decision making and confusion in the direction of our technological forces.

The generals who testified before this subcommittee last week all explained that the lag in our ballistic missile and earth satellite programs was caused by “unsound decision”; lack of “forward-looking decisions”; or redecision, redecision, redecision. The fault, Mr. Chairman, does not lie with the men who made those decisions. As the Army Scientific Advisory Panel has pointed out, the fault is in our decisionmaking process in the development of weapons.

Senator STENNIS. In the what of weapons?

Dr. LIVINGSTON. In the development of weapons. It is imperative, in my opinion, that this particular weakness in our military organization be fully understood.

NEW ORGANIZATION CONCEPTS REQUIRED

To keep pace with the Soviets, to regain world scientific leadership and weapons superiority, we must make a management breakthrough, a breakthrough in our weapons decisionmaking process that will permit us to make sound decisions quickly and thereby take advantage of the technological and scientific breakthroughs before they are exploited by the Soviets. We must free ourselves from the organizational concepts of the past, which hinder our scientific progress, and develop new arrangements for weapons development which are suitable for the rapid technological progress of the space age.

One part of our problem, Mr. Chairman, becomes clear if we examine the steps in our weapons decisionmaking process, and the time they require. These steps are outlined on the chart which is behind me.

As you see, this exhibit is a chart of the decisionmaking process in air-weapons development. It is primarily concerned with manned aircraft; however, the steps are essentially the same for many of our ballistic missiles. There are, however—

Senator STENNIS. Pardon me just a minute. I do not believe your microphone is working; is it?

Dr. LIVINGSTON. Shall I repeat that?

Senator STENNIS. Yes. The press can't hear you. We hear you fairly well.

Dr. LIVINGSTON. As I was explaining, sir. The chart outlines the decisionmaking process for the development of air-weapons systems. It is based primarily on manned aircraft, but many of our ballistic missiles follow the same development pattern.

The Polaris which you have been discussing today, does not follow this pattern so far as I know. The Polaris has been developed by an organization which I did not study.

The important thing about the chart, sir, is the total lead time required for the production of a new weapons system. As you will see, on the average it takes the United States from 10 to 11 years to develop and produce an air-weapons system, whereas it takes the Soviets, on the average, only 5 years to develop and produce a comparable system.

These are average figures, and they cannot, of course, be tied to any one weapons system. However, we can confirm them roughly and establish the same comparison by using published information on certain specific weapons. For example, the B-52 took 8½ years to develop. The Bison, the comparable Soviet bomber, is reported to have been developed in 4½ years. Our supersonic fighter, the F-102, was developed in something between 7 and 11 years; the comparable Soviet supersonic fighter, the Farmer, was developed in 4 years.

Senator BUSH. What was the counterpart to the Farmer you mentioned first?

Dr. LIVINGSTON. The F-102.

Senator STENNIS. Dr. Livingston, these are based on actual studies made by you where you followed through?

Dr. LIVINGSTON. No, sir. I will explain these figures in a moment, but will you accept them for now?

Senator STENNIS. All right.

(The chart referred to is as follows:)

EXHIBIT I.—Decisionmaking process air weapons development (manned aircraft)

Steps	United States ¹	Average time, United States	U. S. S. R. ²	Average time, U. S. S. R.
I. Determine requirement..... 1. Development planning objective (DPO): (a) Strategic and tactical need. (b) Scientific concept. 2. Feasibility study. 3. General operational requirement (GOR).	3 years....	Total planning time, 5-6 years. ³	-----	Total planning time 1½ years.
II. Plan development..... 1. Development plan (DP). 2. Development directive (DD). 3. Selection of contractor.	2-3 years....	-----	-----	-----
III. Design and develop weapon..... 1. Research and development contract. 2. Mockup. 3. Design approval. 4. Prototype production. 5. Prototype testing.	2¼ years....	Total development and production time, 5 years.	2½ years.	Total development and production time, 3½ years.
IV. Production for inventory..... 1. Production contract. 2. Engineering and configuration changes. 3. Production tooling authorization. 4. Production acceleration authorization. 5. Operational testing.	2¾ years....	-----	1 year....	-----
Total.....	-----	10-11 years....	-----	5 years.

¹ Ad Hoc Study Group on Manned Aircraft Systems.

² Col. William F. Scott, USAF (master's thesis).

³ Planning time for ballistic missiles—ICBM Atlas (1946-54), 8 years; IRBM Thor (1951-55), 4 years.

EXHIBIT II.—*Causes of delay in weapons decisionmaking processes*¹

Steps	Time for preparation	Time for concurrence
1. Development planning objectives:	<i>Months</i>	<i>Months</i>
(a) Actual preparation.....	3	
(b) Obtaining concurrences.....		12
2. General operational requirements:		
(a) Actual preparation.....	3	
(b) Obtaining concurrences.....		6
3. Development plan:		
(a) Actual preparation.....	14	
(b) Obtaining concurrences.....		4
4. Development directive:		
(a) Actual preparation and selection of the contractor.....	4	
(b) Obtaining concurrences.....		3

¹ Col. William F. Scott, USAF (master's thesis).

Dr. LIVINGSTON. Let me point out 2 or 3 things about this chart before we go on. First, note the total planning time: From 5 to 6 years are required for planning the development of 1 of our air-weapon systems, whereas it is estimated that in the Soviet only a year and a half is required. In other words, it takes us as long to plan to build a weapon as it takes the Soviets to plan and build it.

Also, look at the development and production time. In our country, development and production take approximately 5 years, on the average; yet the Soviets are able to do this in 3½ years.

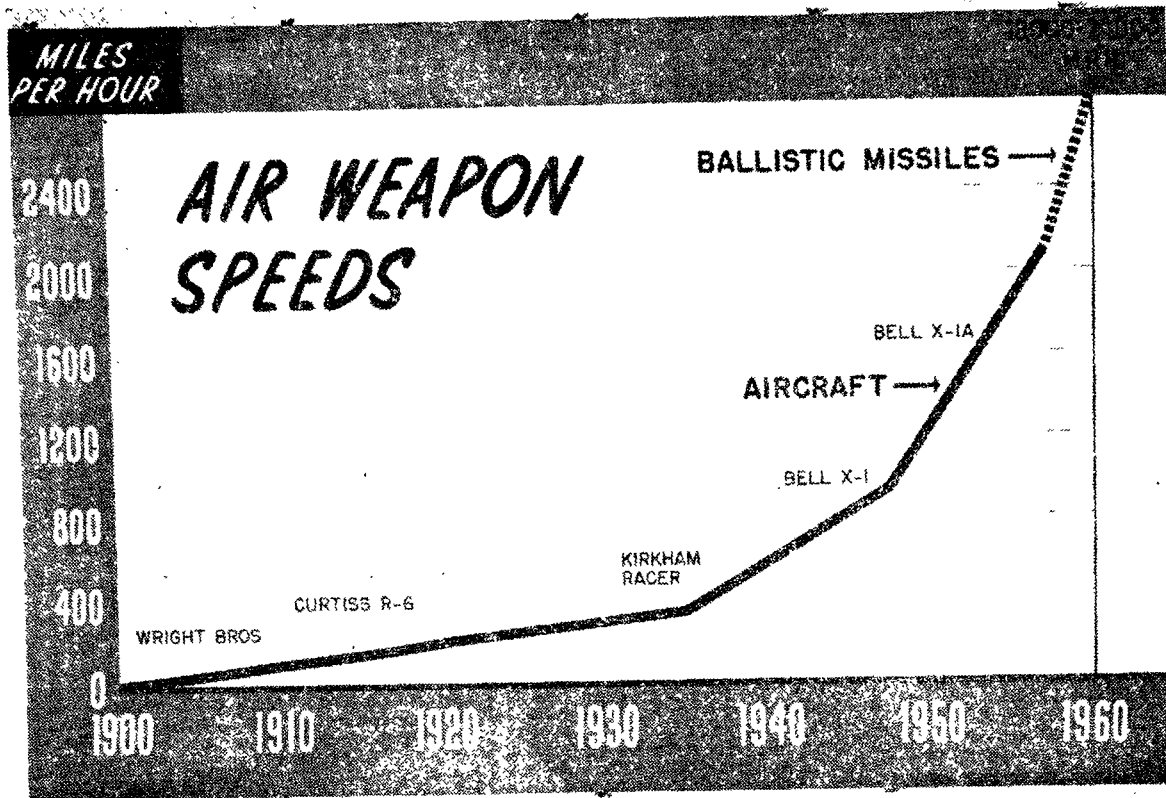
You will undoubtedly find this part of our timelag the most difficult of all to believe. With our tremendous industrial capacity, we naturally assume that we can do this job faster than the Soviets have been able to do it. Our purpose this evening is to examine the differences between our weapons-development cycle and that of the Soviets and to determine why it takes us longer than it takes them to perform these steps. Our long lead time, in my opinion, is one of the major reasons for our lag in weapons development.

I would like to take this chart down, if I may, and show you another chart which will emphasize the significance of lead time and its growing importance.

This chart is simply a presentation of airspeeds. As you will see, for the first, roughly, 35 years after the invention of the airplane, airspeeds were increased from zero to 400 miles an hour. In the next 10 years, speed increased from about 400 miles an hour to 1,000 miles an hour. And in the next 10 years, air-weapon speeds advanced from 1,000 miles an hour to 18,000 miles an hour. It is perfectly obvious, then, that, with the tremendous acceleration in scientific development, lead time becomes a critical factor in weapons superiority.

What I have shown here in terms of speed can be duplicated in terms of altitude or in terms of distance. Sputnik I, for example, has already traveled something like half a billion miles. In the past 50 years, we have advanced further scientifically than the world advanced the previous 2,000 years. And in the next 25 years we undoubtedly will go further than we have gone in the last 50.

(The chart referred to is as follows:)



Consider the matter of lead time in terms of military intelligence. If we assume that the Russians take as long as we do to build a weapons system, we are deceiving ourselves into believing we are ahead. For example, if we were to start at this point and know the Russians had not started on a system, that their previous system was at this point [indicating], we would naturally believe we were ahead; but if the Russians could start, say, at this point [indicating] and still build a weapons system faster than we could, starting at this point [indicating], clearly they would have a great superiority.

In my opinion, there is real possibility that our tendency to underestimate the Soviets has been due to our assumption that their lead time was as long as ours. I think you would concur with me in the obvious conclusion that lead time is of growing importance and will be a decisive factor in the future.

EXPLANATION OF LEAD TIME

Senator BUSH. Would you define lead time, as you use the term right here?

Dr. LIVINGSTON. Yes, sir; I will. Could we put the first chart back, and let me go through the steps? I was planning to do that.

A weapons system begins with the determination of the requirement; nothing happens until a requirement is established. The action involved in the determination of the requirement is as follows:

First, a development planning objective is prepared, based upon the strategic and tactical need for a weapons system and a scientific concept as to how that weapon can be developed. A feasibility study is then undertaken to make sure that the concept for the weapon is sound. Next a general operational requirement is developed which spells out specifically the performance requirements for the contemplated weapons system. This is the first step in the planning cycle and the first phase of the lead time. It takes on the average, as you see, Senator, 3 years.

The second step is to plan the development of the weapon. Three major actions occur under this particular step: A development plan is prepared which breaks down the weapons system by components and establishes a schedule for their development. This, in other words, is a technical appraisal of how the weapons system is to be developed. Next, a development directive is prepared which approves the development plan and authorizes funds to proceed with the actual design. Then a contractor is selected. On an average, it takes from 2 to 3 years to plan the development.

The third step is the actual design and development of the weapon itself. In other words, no development work, except studies, has actually started up to this point.

The design step begins when a research and development contract is let. The contractor then makes a mockup of the weapon for approval. After the decision is made by the service to approve the mockup, the contractor prepares a design. The design then must be approved before the contractor proceeds. Next a prototype is produced, and this eventually is tested. As you see, the design and development step takes an average of two and a quarter years.

The fourth step is production for inventory. The normal procedure is to let a production contract, initiate engineering and configuration

changes which the testing of the prototype indicated were needed and authorize production tooling all at about the same time. Then, after the production bugs have been overcome, a production acceleration authorization is given, and the weapon is placed in full production. At this point the weapon begins to go into operational inventory, but this is only the beginning of the production cycle; and only initial quantities of weapons have entered operational inventory. Additional time will naturally be necessary for production.

Senator BUSH. And it is a combination of all of those steps, including the fifth, which is not charted, they altogether constitute what you call lead time.

Dr. LIVINGSTON. No, sir; not including the fifth step.

Senator BUSH. Not including the fifth step?

Dr. LIVINGSTON. No, sir; only the ones I have charted. In other words, only up to the point where production acceleration is authorized. The weapon will begin to go into operational inventory at this point, but additional time will be required for production.

Senator BUSH. Thank you.

Dr. LIVINGSTON. Now, obviously, the problem is how can we reduce lead time? And may I say, first, that we cannot solve this problem by doing any one thing or by replacing any one group. No one organization or one group of individuals is responsible for this situation. Many people have singled out a particular villain: Some blame the Congress of the United States. Some Democrats blame some Republicans, and some Republicans blame some Democrats. Some people blame former Secretary of Defense Wilson; others blame Deputy Secretary of Defense Quarles. Some blame the military services, and I have heard military officers who blamed scientists who gave them bad advice. And many blame the public for not supporting a larger weapons development budget.

INTENDING NOT TO BLAME ANY ONE GROUP

But all these people have done what they thought was right, and they have done what was expected of them under the circumstances. I emphasize this point, gentlemen, because it is quite likely that during my presentation you will feel that I am trying to blame some one group. Should this be the case, it will be because I have not presented my point of view clearly. As I have said, I do not believe that any one group is responsible. I believe the entire system we are now using is responsible.

Let us examine this chart (exhibit I) again, and I will explain the sources of information on which it is based. If you wish to ask any questions, please feel free to break in.

The lead time for the United States is based upon a study made by the Department of Defense. In 1955 the Secretary of Defense became concerned over our lead time and appointed an ad hoc study group on manned aircraft weapons systems. This study group examined the problem from 1955 until early in 1957, and then submitted its report.

These are average figures reported by the ad hoc study group and are then based on the weapon systems that we produced during the past decade. I think they are quite reliable.

The Soviet figures are somewhat less reliable; however, I think they are adequate for our purposes here. These particular figures are based upon estimates made by Col. William F. Scott, of Air Force Intelligence. They were published in a master's thesis entitled "An Analysis of Time Factors in the Development and Production of Air Weapons Systems," which he submitted to the faculty of the Graduate School of Georgetown University. I commend this thesis to the subcommittee for inclusion in its record.

Senator BUSH. Did he draw comparisons with the Soviet system?

Dr. LIVINGSTON. Yes, sir.

Senator BUSH. In that case?

Dr. LIVINGSTON. Yes, sir; he did, and I shall draw some of those here today. I shall use some evidence from Colonel Scott's thesis, with a good deal of additional evidence.

Now let me begin, gentlemen, with the bottom half of this chart rather than the top half. I will do it that way because our problem is much simpler in the bottom half of the chart than in the top half.

There is no doubt that we can reduce our total development and production lead time to 3½ years and match the Russians. There are certain things, however, that must be done, and I will explain briefly what I think they are.

In the actual design and development of a weapon system, we first let a research and development contract. Now at this point we lose time to the Soviets. We have to select a contractor, and we have to negotiate contractual terms. Sometimes we do this on a broad competitive basis, but more typically we select the contractor after only limited competition. In only 30 percent of the weapon systems which were contracted for during the last decade was formal open-design competition used. In most instances, a method known as "source selection" is used, in which only selected eligible contractors are asked to submit proposals. No matter what system is used, some timelag takes place—from 1 year to as much as 4 years.

In the mockup stage, we apparently do the same thing as the Soviets.

DECISIONS FROM SERVICES TIME CONSUMING

Next, we have the contractor prepare the weapon design for approval by the military services. At this point we depart very much from the Soviets. In this country responsibility for the design and development of weapons is divided between military contractors and the military services. This division of responsibility is not known in the Soviet system, and it causes a considerable amount of delay in our system, particularly because contractors are often unable, except after the passage of a great deal of time, to get decisions from the military services on technical details of a weapons system.

I want to give you an extreme example. Please keep in mind that this is an extreme example, but it will illustrate the point. A contractor wished to change a clock in the cockpit of an airplane from a 1-day clock to an 8-day clock.

Mr. WEISL. Is this an actual example?

Dr. LIVINGSTON. This is an actual example, sir. Before he could change that clock, he had to prepare a justification and submit the justification to the military plant representative. The plant representative forwarded the justification to the military technical people

who, in turn, communicated with the contractor to determine his reasons for requesting the change. After they approved the contractor's request, they submitted it with their recommendation to a committee of the responsible service, which had to approve such changes. The committee was convened. A decision could not be made until unanimous agreement was reached, and then the technical people were authorized to authorize the contractor to replace the 1-day clock with an 8-day clock.

An extreme example, admittedly, but nevertheless it illustrates the division of technical responsibility between our contractors and our military services, and it gives a significant reason for the delay in our system which does not occur in the Soviet system.

Part of the solution to this problem seems to me to be relatively simple. First, delegate greater authority and responsibility to contractors to make technical decisions on weapon systems. The strength of the private enterprise system lies in the creative capacity of our individual contractors. If we do not permit them to make decisions, we cannot take advantage of the strength of our system.

The second part of the solution is to establish within the military services agencies with authority to make prompt contractual decisions, particularly technical decisions. There are exceptions, but for the most part there are no agencies within the military services at the present time which are able to make prompt decisions and which have full authority to do so. The ballistic-missile program is such an exception, and I will come to that in a moment. But first let me describe the normal situation for you.

In each service there is some coordinating group which is normally referred to as a weapons system management group. In the Air Force it is called a weapons systems project office. In the Navy it is a program manager. The Army is developing and adopting at the present time a system comparable to the weapons system project office. Now in the Air Force there is not 1 but 2 weapons system project offices for each weapons system. There is 1 for the Air Research and Development Command, which is responsible for the development of a weapon; and there is 1 for the Air Materiel Command which is responsible for the production of the weapon. Both of these groups are made up of individuals who have an interest in and responsibility for the weapons system.

Meetings of these groups, called weapons system phasing group meetings, are held as required, and are attended by some 20 to 80 members. The chairman of the meeting, the weapons system project officer, has no authority over the members, and he cannot direct them to take action. Action can be taken only when the responsible agency decides to do so. The net result is that there is often considerable delay in making decisions and in getting information to the contractor which he can use in carrying out his particular assignment. Generally speaking, the same situation exists in the Navy.

I should like to stop at this point and emphasize that while I am talking about the Air Force's procedure here, I have no intention of singling it out for blame for the defects in the weapons development decisionmaking process. This is typical, more or less, of all military services; and while the procedures are different, the decision-making process is essentially the same.

In the case of the ballistic missile program, however, the Air Force has a much stronger weapons system project office than it has for other programs. As you gentlemen know, General Schriever is a high-ranking officer in the Air Force. He has responsibility for the air research and development portion of the weapons system project office, but there is also a weapons system project office for the Air Materiel Command.

I understand from the testimony of General Schriever and General Funk, who is in charge of the AMC weapons system project office, that this division of responsibility creates no difficulties. It may well not create difficulties in the case of the ballistic missiles, but in the case of other weapons systems, it certainly has created difficulties.

I believe the conclusion is clear, however, that we must have an effective decisionmaking organization within the military services if we are going to speed weapon design and production.

When General Medaris testified before this committee last Friday, he said:

Some place there has to be one man who can make a decision, who can give a command, and who has the resources to carry it out.

I certainly agree with that, and I think we should keep in mind that the Soviets have used this method admirably. They have developed a keen sense for fixing responsibility; they provide great incentives for success; and they provide very substantial penalties for failure.

As you can see from the chart, the next step, in the development of a weapon is the prototype production, and, here, our system is nothing very different from the Soviets. The next step is prototype testing; once again our procedures are about the same as the Soviets.

When we go into production of a weapons system however, we let a production contract, and there is a delay here which does not exist under the Soviet system. Often some delay is involved in the selection of the contractor, although on major weapons the design contractor is usually also the production contractor. The real delay results from our procurement process.

Engineering and configuration changes must be approved by our military services. This is sometimes a very time-consuming factor under our system, and it is a factor which does not exist under the Soviet system because there is no evidence the military services have to approve their design changes.

Production tooling authorization is another major source of delay. We like to think of our weapons production setup as being one of private enterprise, but this is only partly true. Most of the tools which are used in producing our major weapons systems are owned not by private establishments but by the Government, which provides them to the contractors. In this sense, our weapons production is more socialistic than private enterprise.

The authorization of tooling is a complex process which has held up a large number of weapons system programs, and I believe it has contributed to delay in the ICBM program. However, we are trying to make—and we are succeeding in doing so—substantial improvement in the process of handling tooling authorization. This was one of the major recommendations of the Ad Hoc Study Group on Manned Aircraft Weapons Systems. There have been some improvements here very definitely, and they will contribute to a reduction in time.

But tooling authorization is still a problem which plagues some of our programs.

Let's now turn to the Soviet process. First, the Soviets eliminate the research and development contract step, obviously. The mockup step is the same. They do not encounter the problem of design approval. And may I point out a very important factor. When they undertake the development of a weapons system, typically they have 3 or 4—sometimes only 2—but typically 3 or 4 different designs undertaken simultaneously. They have a very strong competitive system in the design of their weapons.

Now here is a major point of departure between their procedures and ours. When the designs are completed under the Soviet system, production tooling is authorized for all designs that look sensible.

This means they tool up at this point for, say, 3 weapons systems, knowing in advance that they are only going to produce 1.

SELECTION FOR TOOLING MADE OF TESTED PROTOTYPES

When the prototype stage is reached and the prototype system is tested, 2 of these weapons systems will be dropped out, the production tooling for those systems will be scrapped, and only 1 will be authorized for production.

Under this procedure, the Soviets are not delayed by production tooling; and so, as you see, they can get into production in 1 year, whereas it normally takes us $2\frac{3}{4}$ years.

There is another important factor in the Soviet system which varies from our system. When the Soviets reach the prototype testing stage, they select their weapon solely on the bases of its merits.

Mr. WEISL. May I interrupt you? Are you suggesting that the Soviets can produce an operational ICBM in 1 year?

Dr. LIVINGSTON. Not necessarily, but perhaps. If you will make these assumptions, if the Soviets have truly tested a prototype ICBM, and it is a successful prototype ICBM, and if they have followed their normal production procedure and have toolled up in advance for that prototype, then it is entirely possible that they will have an operational ICBM in production within a year. In the case of the Soviet ICBM, and the IRBM, reports that we have indicate—and these are published reports—there is no classified information here—these reports indicate that they are proceeding with two designs on both the ICBM and the IRBM.

Now, gentlemen, we have done the same thing in certain instances. We can do this in 1 year; we can put a weapon in production 1 year after the prototype has been tested. We did it on the F-100, and there is considerable evidence that we are planning to do it on the ICBM and the IRBM programs. We can do it; we have done it. There is no reason to assume, therefore, that the Soviets cannot do it.

Mr. WEISL. If you will pardon the interruption, Professor, is there a certain percentage of greater waste under that system than under ours?

Dr. LIVINGSTON. I think, Mr. Counsel, that we are going to have to decide that we are going to do one thing under our system that we do sometimes, but not always. We are going to have to authorize production tooling as soon as a design is approved; and, preferably, authorize tooling for several alternate weapons systems, knowing in

advance that we are going to scrap a good deal of production tooling when we finally select the 1 or 2 weapons that we are going to put into production.

It is easy to say this is a waste. It is true this is a waste as far as production tooling is concerned; but it is a very good way to buy time. Also, it is an excellent way to buy insurance.

Let me give you an example of that. We are ahead of the Soviets at the present time in nuclear submarines; but, when the nuclear submarine program was first undertaken, we thought the best nuclear reactor, according to the testimony of Admiral Rickover, was a sodium-cooled reactor. We were not sure, however, so we began simultaneously to develop both a sodium-cooled reactor and a water-cooled reactor.

The water-cooled reactor was for the *Nautilus*; and, as you know, that proved quite successful. The sodium-cooled reactor was for the *Sea Wolf*; and, as you know, it was not anywhere nearly as successful. In fact, the *Sea Wolf* is not now operating under full atomic power because of difficulties with the sodium-cooled reactor. In all subsequent nuclear submarines which have been authorized to date, we are using the water-cooled reactor and not the sodium-cooled reactor. If we had selected only one design and had proceeded with only one design, we undoubtedly would have selected the sodium-cooled reactor; and our nuclear submarine program would have been seriously delayed.

So you can see that authorization of alternate scientific weapons systems and the development of production tooling for alternate approaches is not necessarily wasteful, and it certainly speeds up weapons production.

May I summarize what I think needs to be done to reduce the time required for us to design, develop, and produce weapons to a maximum of 3½ years?

First, we need to undertake alternate design approaches to new weapons.

Second, we need to authorize production tooling as soon as weapons designs are completed.

Third, we must delegate greater technical authority and responsibility to weapons contractors.

Fourth, we must establish within our military services weapons system management agencies that have full authority and responsibility for weapons design, development, and production.

I believe that if we take these four steps, we can speed up very considerably our weapons development time cycle.

Senator FLANDERS. Mr. Chairman, may I see if I understand that last suggestion?

Senator JOHNSON. Yes, ask any question you wish.

Senator FLANDERS. I again come to the Ramo-Wooldridge case. Are you suggesting the wider application of the Ramo-Wooldridge setup?

Dr. LIVINGSTON. Oh, no, sir; I am not.

Senator FLANDERS. I would like to get the distinction between that—

Dr. LIVINGSTON. Yes, sir.

Senator FLANDERS. And what you are suggesting.

Dr. LIVINGSTON. I would be delighted to do that.

At the present time, I think the general concept of design contractors—actually I should say engineering contractors—advising the military services, brings about duplication, further division of responsibility, and is ultimately wasteful of talent. I hasten to add, Senator, that I would not disturb the present arrangement with Ramo-Wooldridge under the ICBM program, but let me illustrate what this system is.

The Air Research and Development Command, which has the ultimate responsibility for approving designs, does not have the technical capability to approve those designs. So it hires a contractor to advise it on how to approve designs. The designs themselves, however, are made by other contractors, such as Convair, Glenn L. Martin, or Douglas, so you have three people deciding upon designs—the contractor, the Air Research and Development Command, and an agency advising the Air Research and Development Command.

As you will see—and if I could hold my suggestion as to how we eliminate that situation—

Senator FLANDERS. All right.

Dr. LIVINGSTON. It would be desirable, but this is triplication, and to me is certainly not the way ultimately to build weapons rapidly or efficiently.

I would say one other thing—and this is in no way criticism of Ramo-Wooldridge—they do not have ultimate responsibility for the weapon, and yet they participate actively in decisions on weapons development and design.

May I go on? I think we have made an important point here, however; namely, that the Air Research and Development Command did not have the technical and scientific talent necessary to make decisions, and so it went outside to get that talent. May we look at the top half of this chart? This is where the really difficult problem occurs, and this is where the big timelag is.

It takes us from 5 to 6 years to plan—that is, our total planning time is 5 to 6 years; it takes the Soviets a year and a half for their planning.

Why does it take us so long?

The answer, gentlemen, is very complex; it would take me several hours to go through in detail what happens, and so I will not do that. However, I will go through this very generally for you, emphasizing 2 or 3 things that happen along the way.

We first begin with the preparation of a development planning objective. This development planning objective is stated in broad terms and covers weapons requirements by missions. It is based upon two important factors: First, a strategic or tactical need for weapons; and, second, the scientific concept or recognition of the scientific feasibility of the weapon.

When a need is recognized, then, typically, a feasibility study is requested. The feasibility study normally is conducted by a contractor; and there is a considerable period of delay here for this reason: We have to follow a long, complicated chain extending from those responsible for determining weapons requirements to those responsible for letting contracts for weapons feasibility studies, and then our contractual methods cause an additional delay. I will trace this stage very briefly.

Let us assume that the Deputy Chief for Development in the Air Force decides that a certain concept should be explored. He would send a directive to the representative of the Air Research and Development Command at Headquarters, who would send this on to the Air Research and Development Command, which, in turn, would send it to one of its research centers. That directive would then be converted into a requisition which, in turn, would be converted to a request for a contract proposal request which would then be submitted to prospective contractors. Contractors would then submit their proposals; and after the proposals were received and evaluated by the center, a contract would be negotiated, and the contractor would be authorized to go to work.

After the contractor completed his feasibility study, the study would come back to the contracting center and go back up the chain to Headquarters, USAF. Clearly this is a time-consuming procedure, and more important, it is one that does not exist under the Soviet system. There are other major steps involved in determining the requirement, but I don't believe they are important for our purposes.

There are two major reasons why our planning stage takes longer than the Soviet's does: The first is our procurement process and the fact that we rely on private contractors to do our weapons design work for us. I have told you the process in the case of the feasibility study. When we get down to the development plan, additional design studies are very often requested, and we go through roughly the same process once again.

But the second, and perhaps more important, reason for our delay is that the authority and responsibility for weapons planning is widely divided within each military service. The Ad Hoc Study Group, which I referred to previously, reported on the time required, for example, to prepare a general operational requirement (a GOR) that is, as you will see from the chart (exhibit I), the last step in determining the requirement.

In describing the delay involved in preparing the GOR, Ad Hoc Study Group reported:

When at last a need is crystallized—following a period of from one-half to 4 years of consideration—

in other words, after we passed this step (development planning objective) and this step (feasibility study)—

the requirement for a new aircraft weapon is drafted. This step is taken * * * in the Air Force by the Deputy Chief of Staff for Development, Director of Requirements * * * the draft is distributed to 20 to 30 offices at Headquarters, and it likewise is circulated to interested commands. Following this, it is modified, recirculated if necessary, and placed in an official form known in the Air Force as the general operation requirement (GOR).

"CONCURRENCES" NECESSARY

The division of authority and responsibility naturally results in considerable delay. The Air Force calls the procedure of obtaining approval from the many people who are responsible for the decision "obtaining concurrences." And I would like to show you now the time required in the weapons system cycle for "concurrences."

This chart, exhibit II, is again taken from the thesis of Colonel Scott, who has made a time study of a number of the documents. His

figures, as you will see, are different from the figures that I have used, but that is because he took a different sample and because he was using minimum times.

Now, to go through these steps of preparing the development planning objective, the general operational requirement, the development plan, and the development directive, requires approximately 24 months—just to prepare the documents. To obtain concurrences or approval for those documents takes an additional 25 months. And so, it is perfectly obvious that under our system, we are slowed down considerably by division of authority and responsibility for decisions involved in the development of a weapons system.

I could give you a simple solution to this problem, gentlemen; I could say, "Let's have centralized authority." But that's like saying "Let's have no more sin" or "Let's be for motherhood." It is very easy to say, but it is very difficult to achieve; and there are two very real reasons why.

Technically, I will explain them this way: There is a very broad horizontal division of responsibility within the military services, and an equally broad vertical division of authority. Putting it in other terms, there is a lot of authority at the top of the weapons planning structure, but often this authority is not delegated down to the work level; and when it is delegated down to the work level, it is divided, so that each of many agencies has part of the authority and responsibility, and all must therefore "concur" in order to make a decision.

Senator SALTONSTALL. Mr. Chairman, would it be out of place, before the professor goes into the recommendations, to ask one question? I will be glad to put it through counsel.

Senator JOHNSON. Senator Saltonstall, we would be delighted to have you ask the question.

Senator SALTONSTALL. Professor Livingston, as one who went through a lot of this back in the 80th Congress, have you ever studied Public Law 413 of the 80th Congress, chapter 65?

Dr. LIVINGSTON. No, I do not know it by number, sir.

Senator SALTONSTALL. Well, then, I will hand this to counsel. I will not delay you now. But I am just wondering if some of the delays that you have been suggesting are not due to the fact that one agency head must give very careful consideration when determining whether the purchase contract is for experimental development or research work.

Dr. LIVINGSTON. I am not completely sure that I understand your question, but if you are saying that some good comes out of this system—

Senator SALTONSTALL. No, sir; what I am asking is whether much of this delay is not due to these provisions of this act which Congress drew up to protect the Government where no competitive bidding was conducted, because of development or experimental work? That is my question.

I will not prolong this.

Dr. LIVINGSTON. I cannot answer it, sir, because I am not well enough acquainted with the act of which you speak.

Mr. WEISL. Up to this point, there is no competitive bidding involved, is there?

Dr. LIVINGSTON. There may very well be, yes, sir.

Mr. WEISL. At what point?

Dr. LIVINGSTON. Well, there could be—we will have to go back to the other chart, to see this—but in connection with the development planning objective, it is possible that there would be competitive bidding on a feasibility study; and it is also possible that there would be competitive bidding in connection with the development plan. Typically, these contracts are negotiated with very limited competition, but it is possible, and I perhaps should say probable, that there has been some competition here.

Now, the problem, as I have said, is one of division of authority and responsibility; and while the solution sounds simple—centralizing responsibility and authority—it is actually exceedingly difficult to achieve, and I will explain, gentlemen, why.

There is very seldom a shortage of centralized authority at the top of this organizational pyramid in the military services; if the Secretary of the Navy, Army, or Air Force does not have adequate authority, certainly the Secretary of Defense does. The problem is that either the authority is not delegated to the working level, or, as it is delegated down through the many organizational tiers, each man to whom the delegation passes keeps a little of the authority and passes a little on, so that the man at the bottom of the chain lacks the authority necessary to act.

Let me give you a specific example again from the report of the ad hoc study group.

The Army—

and I am quoting from that report—

The Army made a study in 1956 of the procedures involved in obtaining Secretarial approval on production facility projects and issued a delegation of authority to the chiefs of technical services and intermediate commands in order to reduce review and approval time.

In other words, they recognized the problem and said, in effect, "Let's get this authority down the chain."

The results were not as beneficial as expected. The matter is again under study in preparation for revising the procedures. The chief problem lies in the long review channel between the Ordnance district offices where the projects originate, through three successive headquarters to the Assistant Secretary of the Army.

In other words, the authority did not get down to the working level. And, as I have said, failure to delegate to the working level—not lack of authority at the top—is one of the principal reasons for delay under our present system.

A second reason for delay is that the military services are very large organizations—so large that they cannot be managed without dividing the task into many operating divisions, usually along functional lines.

As I have pointed out, responsibility in the Air Force for the design of a weapon lies with the Air Research and Development Command; responsibility for production is in the Air Materiel Command. Here is an example of the need to divide authority and responsibility, and because authority and responsibility are divided, neither organization can act until it has coordinated with the other. This necessity for coordination throughout the military organization is a staggering cause of delay.

Many consultants have recommended reorganization of the military services. The Navy is a perfect example: consultants have climbed all over the organizational structure of the Navy; and yet it remains essentially the same as it was in the days of the sailing ships.

Mr. Eberstadt, at the end of World War II and after doing what he could to reorganize the Navy, said:

Reorganizing a military service is like kicking a 200-foot sponge around.

There is no really satisfactory way to reorganize the military services; and if there were, we certainly couldn't do it in time to meet the Soviet threat. I think it's time we faced the reality of the situation. The fact is that we are not going to significantly reduce the time required for planning weapons systems as long as responsibility within the services is divided the way it is.

The ad hoc study group, which I have referred to, was made up of a group of very capable consultants. They studied our weapon-planning system thoroughly, and they have made a series of recommendations which are now being carried out or which may be carried out. I have gone over these recommendations very carefully, and it seems optimistic to me to assume that the suggested changes will reduce the planning time to less than 4 years.

Perhaps we could go back to our earlier chart (exhibit I). We have been talking about decision-making time for air weapons systems, particularly manned aircraft. You probably cannot read it, but at the bottom of this chart, there is an explanation of the time required for planning the Atlas ICBM: That time was 8 years. There is also an explanation of the time required for planning the Thor: That time was 4 years.

I think it is quite unrealistic to assume that we can match the Soviets, that we can do our weapons system planning in 1½ years under the present system. We have to break away from the concepts that we now have; we have to break away from our existing organizational structure in order to exploit scientific breakthroughs before the Soviets do.

Before I suggest what I think we might do, gentlemen, I would like to go back to my chart for one moment. I would like to point out that nothing happens, under our system, nothing at all, until a strategic or tactical need for a weapon is recognized.

Now this is very logical in some instances. There is no point, for example, in building an antiballistic missile unless you are going to shoot down a ballistic missile. And so you begin, under our existing concept, with a strategic or tactical need.

However, the military services, often wait for a long time after a weapon becomes scientifically possible or even after it is invented, before they recognize that there is a strategic or tactical need for that weapon.

NAVY WOULDN'T BUY SUBMARINE; IT WAS SOLD IN GERMANY

The submarine is a case in point: The submarine was developed in this country by an independent group of citizens, who found that they could not sell it to our Navy. They went to Europe, finally sold it to the European navies; and, as you know, the Germans were the first to use the submarine extensively.

The ballistic missile submarine which we have been discussing—

Mr. WEISL. You mean the nuclear submarine?

Dr. LIVINGSTON. The ballistic missile launching submarine, is perhaps a better way of saying it.

You will be interested to know that this idea was not originally accepted by the Navy's submariners. Admiral Rickover testified before a subcommittee of the Joint Committee on Atomic Energy that:

A most important submarine is the one with two reactors. Its propulsion plant can also be used for large submarines carrying ballistic missiles. In fact, we had this in mind from the very first. It was changed over from the original concept of a missile carrying submarine to a radar picket submarine because the submariners did not like it. They were not smart enough then to see the possibilities of such a submarine, and so they did not back it.

Our experience with the intercontinental ballistic missile is, I think, comparable. I do not wish to oversimplify this, but none of the services gave high priority to the intercontinental ballistic missile until an independent scientific group was brought into the Air Force to evaluate the missile capabilities in terms of both strategic and tactical concepts. It was only after the Von Neumann committee or the Strategic Missile Evaluation Committee was appointed, and its report submitted, that need for high priority for the intercontinental ballistic missile was recognized.

You have heard testimony from Dr. von Braun about the need for a large rocket motor. I would like to quote him at this time:

We don't have a really powerful rocket engine today simply because none of our present crash missile programs needs it. But in order to beat the Russians in the race for outer space, we absolutely need it—and the development of such an engine needs several years.

The delay that I have been illustrating on this is delay which occurs after the need for a weapon is recognized. But in some instances, there was considerable delay before a need was even recognized. Historically the military services have been slow to accept new weapon ideas. There have been forward-looking individuals within the services who have sought diligently to get acceptance of new ideas, but they have often had to put their careers on the line to get acceptance of a new weapon.

The airplane, of course, is the perfect example; you all know the story of Billy Mitchell. The airplane was invented in the United States in 1907. Six years later, in the year 1913 Mexico appropriated more money for military aircraft than the United States had appropriated in all 6 years from 1907 to 1913. The failure to recognize new weapon concepts, of course, is not peculiar to our military services. The jet engine—the jet engine concept—was invented by Frank Whittle when he was a student at the Royal Air Force Academy; but his paper was given a low grade, and the Royal Air Force failed to develop the jet engine.

Our experience during World War II is particularly illuminating in highlighting resistance to new weapon ideas: Dr. Lloyd V. Berkner was in the Office of Scientific and Research Development during World War II and is now president of Associated Universities, an organization through which a great deal of the atomic energy work of the universities is carried on. He informed the Subcommittee on

Military Appropriations that during World War II—and I am quoting:

The OSRD usually found very great resistance to any new idea or weapon while it was in the process of development. The files are replete with statements of high military authority concerning these "ridiculous" ideas; and, in most cases, these ideas would have been killed had the military been in control. * * *

In the case of the naval single place night fighter, those naval men who worked closely with the OSRD in its development literally staked their reputations on its success. Early in the war the idea of a night fighter operating from carriers was met with actual derision. But, as soon as experimental night fighters had been built and operated from carriers against actual targets, all resistance to their employment disappeared. * * *

The point is—

and I am still quoting Dr. Berkner—

that radical and conceptual ideas must be developed outside of military control up to the point of experimental and tactical demonstration.

Dr. Berkner added that the development of radically new weapons—has never done successfully under the control of the armed services and no example to the contrary can be cited.

Senator BUSH. Not even in Russia? How do they do it?

Dr. LIVINGSTON. I will come to that, sir. Obviously, Dr. Berkner's statement is an overstatement. And the first thing that comes to mind is the nuclear submarine. Here surely we are ahead of the Soviets, and here surely is a weapon which is a credit to our country.

May I quote from a statement on the nuclear submarine, made by Admiral Rickover, before the Joint Committee on Atomic Energy. He said:

There is one more thing I must say which I have said many times before, but I would like to say it again. Had it not been for the Atomic Energy Commission and the joint congressional committee, we would not have any nuclear-powered naval vessels today.

That statement was made on April 12, 1957.

Senator SALTONSTALL. Would the chairman permit one observation or question?

Senator JOHNSON. Yes, Senator Saltonstall.

Senator SALTONSTALL. Professor Livingston, I hope you will give credit, too—it is none of my business and I do not want to interrupt—to Dr. Vannevar Bush, Dr. Conant, the gentlemen from Cal Tech, Mr. Teller and the other gentlemen who developed atomic energy—rather the theory of atomic energy. Those fellows have to be given a lot of credit.

Senator JOHNSON. As I understand it, the professor is just quoting a statement from Admiral Rickover, is that correct?

Dr. LIVINGSTON. Yes, sir. I am not trying to give credit to or take credit from anyone. The statement, I think, says—and the purpose of my reading it is to point out—that we would not have a nuclear-powered submarine if it had been left to the Navy to develop.

Senator JOHNSON. Admiral Rickover is the author of that statement?

Dr. LIVINGSTON. Yes, sir, that is correct.

Senator JOHNSON. And Admiral Rickover is going to be a witness before the committee and we can get him to include anybody he wants to add.

Proceed, professor.

Dr. LIVINGSTON. Why have the military services historically been slow in developing and accepting new weapons ideas? I think the reason is this: the military services tend to concentrate on short-term objectives at the expense of long-term research and development. They always have, and I believe they always will, because their primary mission is maximum readiness.

Just a few moments ago I heard Admiral Burke testify, and I know that Admiral Burke believes that a balance has been struck between advanced research and development and maximum readiness. However, Dr. Teller testified that the military services will not take big risks in research and development, and General Medaris testified that we will not get into this race—speaking of the race for the conquest of outer space—as we should, so long as our objectives are short term.

But the objectives of the military services are short term and they will always be short term, and I believe they always have to be short term.

The tendency of the armed services to emphasize short-term readiness is clearly demonstrated, in my opinion, by Admiral Rickover's explanation of the delay in shifting from conventionally powered ships to nuclear-powered ships. In response to a question posed by Representative Van Zandt as to whether the Navy was still diverting money appropriated for nuclear-type construction to conventionally powered ships, Admiral Rickover stated before the Joint Committee on Atomic Energy:

You people always ask the question: "Why do you build any other ships now that you have nuclear power?" You have to put yourself in Admiral Burke's place. He has commitments he must meet today * * * and he has not got the fine nuclear-powered ships. He has got to have ships today; he cannot just obligate all his construction money on the nuclear-power program. Perhaps a generation from today people will say, "They were damn fools for not having done it," but the people who say that will not have been faced with the problems that we are faced with * * *.

In short, the military services are confronted with the problem of balancing available resources. They must balance those resources in terms of the threat as they see it, and inevitably the top command balances in favor of short-term readiness. There is a balance of 1 and 1, but it is something like 1 horse and 1 rabbit.

Secretary Norton who testified today—and as I understood him—he said essentially this:

The No. 1 business is the missile business. Nothing should stand in the way of accomplishing this. I do not belittle space and the space programs, but let us do first things first.

There can be no real argument with that conclusion. If you were responsible for developing the ballistic missiles at the present time, I am sure you would give the highest priority to that program, because if we fail to develop the ballistic missiles in time, we may not be around for the race for outer space. And so it is natural that those people who are confronted with the immediate threat will concentrate their expenditures on those things that give maximum readiness.

In my opinion, this dilemma in the military services will always be resolved in this way. And in spite of the complaints which you heard last week from those in charge of research and development in the Army, we cannot expect a balance if a balance means giving equal

priority and funds to short-term projects and to long-term projects. We are not surprised, gentlemen, when the railroads were not in the forefront in developing pipelines or trucks or airplanes, and we did not expect the motion-picture industry to pioneer television. Then why do we expect the military services to give top priority to the development of radically new weapons concepts?

Let us keep in mind that radically new weapons usually grow out of scientific breakthroughs, not strategic or tactical requirements.

A-BOMB A CASE IN POINT

The A-bomb is a good example; we probably would not have an atomic bomb today if we had had to wait for a strategic or tactical need for the A-bomb. We have an A-bomb because a scientific breakthrough made it possible; then independent scientists recognized its feasibility and took the idea to the President, who then put the resources of the country behind its development.

Scientific knowledge and understanding are not the primary characteristics or the primary requirements of a fighting man, and it is understandable, therefore, that the services have at times not recognized the feasibility of new weapons concepts.

I should like to read one more quotation. Once more it is from Dr. Killian's testimony before a subcommittee of the Armed Services Committee. Dr. Killian said:

As the Hoover Commission report on research and development commented, the military services "have not distinguished themselves in the initiation of radically new approaches to weapons systems."

There are striking exceptions to this, but it could hardly be expected that the really radical approaches would come from within the services.

They must originate in the creative basic research that takes place in the universities and other institutions where the fundamental new ideas are most likely to be generated.

In view of the rapid rate of scientific and technical progress, we cannot wait for the recognition of a strategic or tactical need by the military services before we exploit scientific breakthroughs. If we are to survive as a Nation, we can no longer endure the 4-year cycle which the military services, present decisionmaking process requires. It is imperative, in my opinion, that we break with the past, that we break with the complex organizational structure which has resulted in loss of our commanding technological leadership and weapons superiority, and adopt new concepts and new organizational patterns which are in step with the space age. The Nation is looking for a positive program which will enable us to take advantage of the knowledge and skill of our scientists and the creative capacity of our private-enterprise system. It is our duty to make the management breakthroughs the people are demanding.

Mr. Chairman, I have recommended several changes in our weapons decisionmaking process, and I now have another to suggest. There may be better approaches than this, but I have a program that I am confident will meet the problem that confronts us.

I recommend that we bypass our existing decisionmaking process in weapons development and that responsibility for the development of radically new weapons and scientific equipment, such as earth satellites and space vehicles, be transferred to an independent, scientific

agency outside the Defense Establishment. This agency should have full authority to take advantage of scientific breakthroughs without approval or concurrence of the military services.

The agency should be organized on the basis of weapons systems or scientific systems, so that full authority and responsibility can be delegated to the working level and delays inherent in the existing weapons decisionmaking process can be avoided. The head of this agency should report to the President and should be a member of the National Security Council. This scientific agency should have a long-term budget and should be authorized to undertake long-term research and development projects. It should maintain close liaison with the military services, as the Office of Scientific Research and Development did during World War II and the Atomic Energy Commission has done since.

As soon as one of the military services establishes an approved requirement for any weapon under development, appropriate arrangements should be made to transfer responsibility for the production of that weapon to the service. Thus, the military services should be considered as customers of this agency.

The work of the agency should be conducted largely through institutes managed, if possible, by our engineering schools. Separate institutes should be established for each major technical field, such as fuels and propulsion, astronautics, and electronics. These institutes should be staffed by outstanding young scientists, engineers, and administrators from our universities, from our industrial concerns, and from our military services. They should conduct basic research in order to advance the frontiers of science as rapidly as possible, and they should contract with private concerns for the design and development of weapons and scientific equipment.

They also—and I believe this is important—they also should act as centers of scientific information, both classified and nonclassified.

Scientific and technical journals from all leading foreign countries should be deposited, translated, and distributed by the institutes to make sure that our scientific community and our industrial enterprises are kept fully informed of developments in other countries. Technical military intelligence reports should be made available through these institutes to military contractors, and the institute should be responsible for keeping military planners apprised of the significance of the state of the art in foreign countries as well as our own. They also should assist military planners to understand new weapons developments which scientific breakthroughs make possible.

Working through these institutes, the new scientific agency should be able to mobilize the Nation's scientific and engineering talent and undertake the vigorous research and development program which we must have to win the race for the conquest of space. The prestige of these institutes and the salaries they could pay should attract the Nation's best young scientists and engineers and thus overcome one of the growing handicaps to scientific work in our military services.

WORK ON NEW WEAPONS WOULD NOT AWAIT MILITARY REQUIREMENT

And now may I summarize: The primary objective of the independent scientific agency should be to reduce weapons development time to 5 years or less by bypassing the complex decision-making

process employed in the military services and by beginning work on new weapons as soon as they become scientifically feasible, without waiting for the establishment of a military requirement for the weapon. This is essentially how the Russians do it, and this is the major reason why they have overtaken our technological leadership.

Senator Bush, you asked a question which I would like to answer. I should like to point out that the Soviet satellite program and their ballistic-missile program are not under the control of the Soviet Ministry of Defense, but are the responsibility of the Soviet Academy of Sciences, which reports directly to the highest agency of the Russian Government. Although there is very close liaison between the Ministry of Defense and the Academy of Sciences, Soviet scientists and weapons designers are not controlled by the heavy hand of military bureaucracy, nor are they confined to scientific and technical projects which have an immediate military application.

The agency I suggest, Mr. Chairman, also should have a secondary objective, and that objective should be to restore the scientific prestige of the United States. Our technical and scientific leadership was generally acknowledged a few months ago, but it has suffered a severe blow. Our race with the Soviets is not solely an arms race in which the stakes are survival of western civilization. Indeed, let us hope that we and the Soviets possess enough sanity to avoid mutual suicide. But if we are strong enough and wise enough to avoid world war III, we shall continue to engage the Soviets in an ideological race in which the stakes are the minds of men of the uncommitted nations. In that ideological race, outer space may well be the proving ground on which the uncommitted people of the world will judge whether the democratic, free enterprise system or the Communist system is superior.

Outer space is a gigantic showcase for the products of two competing systems. The time has come, in my opinion, for us to give high priority and an ample budget to those scientists who have a desire to put superior American-made products in that showcase whether those products have an immediate military value or not.

We should not—we cannot—rely solely on the military services for world scientific and technical leadership. We must establish an independent scientific agency and give it authority and funds needed to win the race for the conquest of space.

Thank you.

Senator JOHNSON. Thank you very much, Dr. Livingston. You have made an important contribution to the committee. If you desire, we will declare about a 5-minute recess before the counsel starts with your examination.

The committee will take a recess for 5 minutes.

(Short recess.)

Senator JOHNSON. The committee will come to order.

Mr. WEISL. Dr. Livingston, it has been suggested in connection with your quotation of Admiral Rickover's statement about the atomic submarine, that at that time there was great resistance generally to the use of atomic energy for military purposes, and that that might have also delayed the effort to construct the atomic submarine.

Unfortunately, that is not in the Congressional Record, but the Navy people have advised me of that fact, and I think in fairness to them it should be in the record.

Now, Dr. Livingston, the suggestion is being made by you that military profit policies be reviewed; did I understand you correctly?

Dr. LIVINGSTON. Perhaps in connection with the facility policy; but I did not go into that in great detail. If you wish to open it, I would.

Mr. WEISL. You do not want to go into that?

Dr. LIVINGSTON. I do not believe it is germane here.

Mr. WEISL. Very good. Are you recommending duplicate production tooling when you say in advance that part of the tooling will end up on the scrap pile? You have explained that in the long run that may be the efficient way and the cheapest way to produce weapons early and efficiently. Do you want to add anything to that at all?

Dr. LIVINGSTON. No, Mr. Counsel, except to say that I think if we do not do this—even though it may be costly in terms of tooling—we cannot buy the time which we must have to keep pace with the Soviets. I think it is essential that we be willing to waste tooling in order to buy time and insurance. I think understanding of this is a major factor in our ability to reduce our time cycling to $3\frac{1}{2}$ years for the design and production of weapons.

Mr. WEISL. Did I understand you correctly in your statement that there was divided authority and responsibility even in our present ballistic missiles system program?

Dr. LIVINGSTON. If you interpret that to mean that General Schriever does not have all of the authority for the missile program, I think there is no question about the fact that there is divided authority and responsibility in our ballistic missile program. Yes, there is divided authority, because there is a weapons-system project office for both the Air Materiel Command and the Air Research and Development Command. I am sure the Secretary of the Air Force keeps some authority over the program. I would assume that the Assistant Secretary for Research and Development keeps some authority over the program, and I would be reasonably sure that the Special Assistant to the Secretary of Defense for Guided Missiles has some authority over the program. And in the Army you have the same kind of division.

Mr. WEISL. And the Navy the same?

Dr. LIVINGSTON. In the case of some programs, yes. I perhaps should add that a great deal has been done by the Air Force to eliminate as much division of responsibility as possible on the ICBM program. When I say "as much as possible," I mean as much as possible without changing basically the organizational concept of the Air Force.

Mr. WEISL. Is that since sputnik?

Dr. LIVINGSTON. No. This was done since the Von Neumann committee.

Mr. WEISL. In order to clarify the record, are you suggesting that we abandon formal, open-design competition to save time, or are you suggesting that we have more design competition in order to gain the benefits of competitive designs?

Dr. LIVINGSTON. I am very pleased to answer that question. I think we are now abandoning formal, open-design competition, and we are doing it because it is time consuming. We could have considerably more formal, open-design competition if we authorized production tooling as soon as we approved designs; in other words, if we were willing to waste production tooling, we could have more competition.

Mr. WEISL. Would you get a speedup of the time lag?

Dr. LIVINGSTON. A very considerable speedup, because you wouldn't have to wait, after you selected the contractor, for him to then go out and buy his tooling, and long lead-time items.

Mr. WEISL. You quoted from Colonel Scott of Air Force Intelligence and his thesis.

Dr. LIVINGSTON. Yes.

Mr. WEISL. Did you also interview Colonel Scott?

Dr. LIVINGSTON. Yes, at length.

Mr. WEISL. You said something to the effect that the speedup of the ballistic-missile program cannot take place through the Special Assistant to the Secretary of Defense. Did you mean that, or just what did you mean?

Dr. LIVINGSTON. I am not sure I said that exactly. I said that I felt there was no shortage of authority at the top of the organizational structure, and I would include the ballistic program in that statement.

Certainly the Special Assistant for Guided Missiles can speed up the program by running interference, by getting more resources, and by making available to the people who have to have those resources what they need to carry out their task. However, this does not automatically insure speedup of the program. If the man at the top retains some authority but delegates some of it down through the chain of command, and if each of the individuals at the various levels of the command retains part of this authority, the program would certainly not be speeded up. I do not believe this has happened in the case of the ballistic-missile program, however.

Mr. WEISL. I wonder, Doctor, if you could summarize briefly and simply and clearly how the independent agency that you recommend would reduce the lead time and speed weapons development.

Dr. LIVINGSTON. I shall try.

First, this agency should have authority to initiate weapons development as soon as scientific breakthroughs occur, without waiting for the military services to establish a strategic or tactical requirement for the weapon. This should certainly speed things up. Also, the agency should bring about some of the scientific breakthroughs which are necessary for weapons development.

Second, the agency could initiate component development, such as large rocket motors, on a continuing project basis without waiting for a weapons requirement.

Third, it could organize on the basis of weapons systems, or scientific systems, so that full authority could be delegated to the working level. May I digress to say that this form of organization is now being adapted in many industrial concerns for the same reason; namely, so that authority and responsibility can be centralized in the hands of a few people. In this way you can avoid the wide division of authority and responsibility which is inherent in any large-scale organization.

Fourth, I think this agency could mobilize an outstanding scientific and engineering staff and work closely with scientists in our universities and in our industrial concerns. By establishing centers of scientific information and a focal point for scientific liaison with the services and with scientists from NATO countries, we should be able to transmit an understanding of scientific developments faster.

I believe an agency of this kind could establish closer relations with contractors and considerably shorten the procurement lead time. I think it could avoid resistance to new concepts, since its only mission would be the development of radically new weapons. It could also avoid concentration on short-term objectives because it wouldn't have any; and the agency, in order to keep from going out of business, would have to stay far in advance of the military services. And, finally, it could take development risks which the military services are unwilling to take because they consider these risks too high, because there is the danger that their readiness program might be impaired.

Mr. WEISL. What about the Advanced Research Agency announced by the Secretary of Defense. Couldn't that accomplish everything that could be accomplished by an independent agency?

Dr. LIVINGSTON. I must say, Mr. Counsel, that I think the announcement of the establishment of this agency has been a fairly cryptic one. I am not clear about what this agency is going to do, and so, in answering that question, I may not have full information.

Mr. WEISL. Well, assume that that agency would do within the Department of Defense what your independent agency would do outside the Department of Defense.

Dr. LIVINGSTON. I would like to raise then a series of questions:

First, the Office of the Secretary of Defense is a policymaking organization; it is a board of directors. I think there is a fundamental question as to whether or not the board of directors should get into operations.

I am sure you are a member of a board of directors, and I am sure you would have some question as to the wisdom of a board of directors that found that the plant manager was not doing a good job and so set up its own plant to do the job.

On the other hand, the Secretary of Defense apparently has found inadequacies in the space projects of the services, so I think that we should not be too critical of anything constructive which is being done.

There is, however, a further question in my mind as to whether whatever authority this new organization has should not have been delegated down the organizational structure.

I read in the newspapers, that the Air Force was going to set up a directorate of astronautics, and that this apparently was canceled because it was an attempt, as the newspapers have stated it, to grab the limelight. Well, should these plans have been canceled, or should the Office of the Secretary of Defense have said to the Air Force, "It's wonderful; It's about time you did this; Now go ahead"?

I don't know, but it would seem to me that if your operating organization is trying to do a job, the board of directors should not duplicate the job.

Mr. WEISL. Those are all the questions I have, Mr. Chairman.

Senator JOHNSON. Senator Bush?

Senator BUSH. Go ahead.

Senator JOHNSON. While Senator Bush is looking at his notes, I would like to ask you to submit for the committee's consideration your detailed recommendations for the reorganization of the Defense Department in order to reduce the lead time.

IMPOSSIBLE TASK

Dr. LIVINGSTON. I think this is an impossible thing to do, sir. I agree with Mr. Eberstadt that reorganizing the military services is like kicking a 200-foot sponge around. It would be both presumptive and impossible for me to suggest how that tremendous organization should be reorganized so as to carry out its work faster. In short, I am of the opinion that it can't be done.

Senator JOHNSON. So in effect what you have done is taken the easy way out by just putting one over on the side, by setting up a new agency?

Dr. LIVINGSTON. Well, if you wish to call it the easy way out, yes, sir, that is what I have done.

Senator JOHNSON. Well, I mean I am just taking your conclusion. You say the other one is like kicking a 200-foot sponge, I don't know whether your solution would be easier or not, but I assume it would be.

Dr. LIVINGSTON. Considerably easier; yes, sir.

Senator JOHNSON. Fine, I am correct then.

Dr. LIVINGSTON. Yes; I am sorry I misinterpreted you.

Senator JOHNSON. You brought out the fact, that the Soviets have one organization which is there to develop their missile programs and missile systems and also their satellites program; is that true?

Dr. LIVINGSTON. As I understand it; yes, sir.

Senator JOHNSON. They have 1 program where we have several in the 3 different services at least and each 1 has apparently 2 or 3.

Dr. LIVINGSTON. Yes, sir.

Senator JOHNSON. Yes, or more.

Dr. LIVINGSTON. Yes, sir.

Senator JOHNSON. You are satisfied, I take it, from what you say, that the concentration of all this into one organization which can serve all of their armed forces is an efficient way of proceeding, that the Soviets have demonstrated that and that your statistics here are pretty good evidence of that demonstration. Is that right?

Dr. LIVINGSTON. Yes, sir. I think so. I would like to comment on that observation if I might.

Senator JOHNSON. I wish you would.

Dr. LIVINGSTON. I think it is highly important that we do not confine ourselves to one system of approach in the development of a weapon. On the other hand, I think it does not make a great deal of sense to have duplicate weapons developed on the same approach.

Let me be specific. We have two intermediate-range missiles, the Jupiter and the Thor. They are both based on the same systems concept, the same systems approach. Now, while I would not cancel either of them at the present time, I would think that scientifically you would not have started both of them in the beginning, you would have started only one; because if one will work, the other one will.

Now there was considerable "delay" as I understand it—and perhaps I should use that word advisedly—in beginning work on the solid-fuel missile. I have read instances, for example, where we have delayed for 4 years in getting a really large, solid-fuel propellant rocket underway.

If we had undertaken a solid propellant rocket as our second program at the same time that we undertook the Thor and the Jupiter,

we might have had insurance against failure and we might have been further ahead.

Senator BUSH. Now, Dr. Livingston, moving on to just a slightly different area for a moment, you have devoted all of your argument to the missile question, and the—well, not entirely—but the question of weapons.

Dr. LIVINGSTON. That is right.

Senator BUSH. And the delay caused by lead time and the delegation of authority and the like and that sort of thing.

Now there has been considerable discussion from time to time here in these hearings of the whole question of the organization of the Defense Department, and 2 or 3 very eminent witnesses, notably General Gavin, was it not, who was the most recent one, I think, General Doolittle, Vannevar Bush, all raised the question about the organization of the Defense Establishment.

I wonder if you have any comments that you would like to make for the benefit of the committee in that connection?

Dr. LIVINGSTON. Are you thinking specifically of the Joint Chiefs?

Senator BUSH. I am thinking of the Joint Chiefs in connection with the whole problem.

For instance, it has been said by General Gavin, last Friday, I think it was, Friday night right here, that the Joint Chiefs was a very fine organization but it was a planning organization. It was not a command organization and he discussed the possible alternative of having a unified command organization.

He brought out the fact that with that type of organization the Defense Secretary would have much sounder military advice and much more professional military advice and so forth which he does not get under the present setup, according to this particular witness.

It would seem to me that if the unified command organization was good enough for our forces under General Eisenhower in World War II, if it is good enough for the NATO organization which General—under General Norstad's command and his predecessors and we also have it, I believe in the Pacific under Admiral Stump which was brought out, if we do these things in actual operation, why don't we actually do them here in connection with the Defense Establishment?

I wondered if you had given any thought to that or whether you would care to comment on that?

Dr. LIVINGSTON. Not enough thought to comment extensively.

Senator BUSH. All right.

Mr. LIVINGSTON. Let me just say two things.

Senator BUSH. All right.

CIVILIAN VERSUS MILITARY

Dr. LIVINGSTON. Let me just say, first, that as you know the argument over whether or not we should have a general staff concept has been going on for years; and I think it essentially revolves around the question of how much authority should be in the hands of the military, as opposed to the civilian Secretaries.

Senator BUSH. Well, if you will permit me, doesn't it also revolve around the question of which is the most efficient and will give us

the most economical and efficient administration of the Defense Establishment?

Dr. LIVINGSTON. Yes.

Senator BUSH. I think that is a very important question.

Dr. LIVINGSTON. Yes; I certainly did not mean to exclude that. But this argument has been going on for quite some time. It is entirely possible that some rearrangement of the Joint Chiefs is in order.

I am not qualified to say what that rearrangement should be, but I would like to say one other thing about it. I do not believe that changing the organization of the Joint Chiefs will change the way top military men think. I think we will still get concentration on short-term readiness at the expense of long-range development because I think this is the result of the training of military officers. When they are responsible for the forces in being, they will tend to make the same kind of decisions that they have been making.

Senator BUSH. Well, I wasn't suggesting that this unified command or general staff concept would take the place of your suggestion about a ballistic command setup, a separate thing like the Atomic Energy Commission or like the Manhattan project, I was not suggesting it be done in place of that but this, if we are really going to organize our Defense Establishment and try to make it more efficient, I am very much impressed with some of the suggestions you have made, all of them in fact, and I was just bringing out the other thing as a related exchange that has been under discussion to see if you have any views about it but I can quite understand you do not wish to comment about it.

I have no other questions, Mr. Chairman.

Senator JOHNSON. Senator Symington?

Senator SYMINGTON. Dr. Livingston, I have been very interested in what you have said.

Some time after the start of the next session perhaps we could sit down together and go through with the briefing which you said was a great deal longer than the one you gave today.

You chose the Air Force.

This is really the thesis of Colonel Scott, is it not, with some of your own ideas added to it?

Dr. LIVINGSTON. No, sir, I would not say that. I would not blame Colonel Scott for that.

Senator SYMINGTON. You would not blame him for that?

Dr. LIVINGSTON. I think you could start with the ad hoc study group. When you analyze the report of that group then I think you come inevitably to these conclusions. In fact I would say, if you will permit me, that Colonel Scott would probably be the last man to recommend taking responsibility for weapons development away from the military services.

Senator SYMINGTON. I am glad you mentioned that.

Now you have an interesting sheet there.

How long have you been interested in the functioning of the Air Force?

Dr. LIVINGSTON. Could you say the military services?

Senator SYMINGTON. No; just the Air Force.

Dr. LIVINGSTON. Just the Air Force alone? I would say in detail, 2 years.

Senator SYMINGTON. And the Army?

Dr. LIVINGSTON. Perhaps 6 years.

Senator SYMINGTON. And the Navy?

Dr. LIVINGSTON. Well, 10 years.

Senator SYMINGTON. If one is 10, one 6, and one 2, why did you pick the Air Force?

Dr. LIVINGSTON. I picked the Air Force because the ad hoc study group has the most reliable explanation of figures on the Air Force. I thought I emphasized that the system used by the Navy is almost exactly the same, and the time is almost exactly the same.

Senator SYMINGTON. Yes.

Dr. LIVINGSTON. I was not picking on the Air Force.

Senator SYMINGTON. Let me say there are many points you have made with which I agree; and, therefore, there is no use of discussing those.

There are some others though I want to discuss briefly.

The chief problem I found in this situation was changes in programs. I remember 10 years, or 11 years ago, when General LeMay was head of Air Force research and development he said:

I have done nothing in the way of research and development with my people for the past year; all I have done is reprogram.

Do you reflect that in your analysis?

Dr. LIVINGSTON. I don't think it comes in the analysis.

Senator SYMINGTON. Perhaps since to me it is the most important characteristic of all you would give it consideration when you come down.

Dr. LIVINGSTON. The reprogramming which takes place say at the time the development directive—

Senator SYMINGTON. Will you give that the consideration you think it is worth?

Dr. LIVINGSTON. I am well aware of the problem; yes, sir.

Senator SYMINGTON. Thank you.

Now you say you would tool all the jobs, all the development, in order to play it safe.

Dr. LIVINGSTON. All the promising development.

Senator SYMINGTON. All the promising development.

Dr. LIVINGSTON. And may I point out what is very important. I would not permit alternate designs on the same concept necessarily. I would be thinking in terms of alternate approaches, rather than duplicate approaches. And then I would tool duplicate plants.

Senator SYMINGTON. Yes.

Now, when you say remove the decision on weapons from the services, you in effect remove the decision on weapons systems from the services, do you not?

Dr. LIVINGSTON. No, sir. Let me explain why.

Senator SYMINGTON. You said ballistics missiles, for example, did you not?

Dr. LIVINGSTON. Yes.

Senator SYMINGTON. Well a ballistic missile is a weapons system, isn't it?

Dr. LIVINGSTON. Yes, sir; that is correct.

Senator SYMINGTON. Then am I right?

Dr. LIVINGSTON. May I explain? These words may mean something to you and something else to me.

Senator SYMINGTON. Yes.

Dr. LIVINGSTON. I do not believe this agency should begin by trying to develop launching equipment and launching sites, for example.

Senator SYMINGTON. Yes.

Dr. LIVINGSTON. Now, weapons systems are going to include launching sites and support equipment, as well as the missile itself, correct?

Senator SYMINGTON. That is right.

Dr. LIVINGSTON. I would think that this organization would confine itself to that equipment which was necessary to demonstrate the weapon. Now that would include some equipment that you would describe as weapons system equipment. But it would not include the full weapons systems.

Senator SYMINGTON. But you know we are having steadily more trouble in the services because our defenses are becoming steadily more complex—and therefore, we need higher grade people.

Dr. LIVINGSTON. Exactly.

Senator SYMINGTON. Better mechanics.

Dr. LIVINGSTON. Exactly.

Senator SYMINGTON. If you take away the decision as to what weapon is the right weapon, don't you curtail and retard the opportunity of understanding how to use it?

Dr. LIVINGSTON. You certainly would, but I think you did not understand my recommendation, sir.

At any point—and I want to emphasize this——

Senator SYMINGTON. Yes?

Dr. LIVINGSTON. At any point that an approved requirement exists for a weapon, responsibility should be transferred from this new agency back to the agency of military service which has the new requirement for the weapon.

Senator SYMINGTON. At what point would the improved requirement come through?

Dr. LIVINGSTON. Well, it is at the development directive stage here; in other words, before selecting a contractor.

Senator SYMINGTON. Yes?

Dr. LIVINGSTON. And while the military services are going along with their planning, the new agency would be going along with the development.

Senator SYMINGTON. I would like to have you give consideration to my thought, and not think I am misunderstanding you consistently.

Suppose the new weapons-system people decided on a weapon that a service, say the Navy, decided against and the weapons-system people decided for the new agency—what then?

Dr. LIVINGSTON. It would only carry the weapon through prototype stage, and then it would be dropped.

Senator SYMINGTON. Who would drop it?

Dr. LIVINGSTON. The new agency.

Senator SYMINGTON. By that time you have lost all the time, and still have not the weapon that the service believes necessary.

Dr. LIVINGSTON. I had not at any point said that the services should not develop weapons. I think the problem, sir, is not that the services

don't develop the right weapons. I think the problem is that they don't start soon enough.

Senator SYMINGTON. Let me switch, because apparently this is something we would have to sit down and talk at considerable length about. You expressed, in a pamphlet that somebody sent me, great confidence in OSRD; right?

Dr. LIVINGSTON. Yes.

Senator SYMINGTON. Let me read what you said:

The first step that must be taken to regain undisputed weapons superiority is to transfer responsibility for the development of radical new weapon concepts from the Department of Defense to an independent civilian agency like the wartime Office of Scientific Research and Development.

Is that a quote?

Dr. LIVINGSTON. Yes, sir; that is correct.

Senator SYMINGTON. Do you still believe that?

Dr. LIVINGSTON. I made some changes in the function of that agency, but, generally speaking, yes, I still believe that.

Senator SYMINGTON. You made some changes in the function?

Dr. LIVINGSTON. Yes.

Senator SYMINGTON. I don't quite understand that.

Dr. LIVINGSTON. I think the agency should do some things that the Office of Scientific Research and Development did not do, and I think it should operate in some ways that the Office of Scientific Research did not.

Senator SYMINGTON. Did you know that the former Head of the Office of Scientific Research and Development killed the ballistic missile?

Dr. LIVINGSTON. Well, when you say that, Senator, I am not completely sure that I know it; nor am I in a position to say this is accurate or inaccurate.

Senator SYMINGTON. I am not asking you what your position is as to the accuracy of it. I am asking you if you knew that?

Dr. LIVINGSTON. As I understand it, you are telling me that he did kill it.

Senator SYMINGTON. No; I am asking you what you know about it.

Dr. LIVINGSTON. I do not know his position.

Senator SYMINGTON. If it was true it would be right important; would it not?

Dr. LIVINGSTON. Well, yes, if it were true, it would be important.

Senator SYMINGTON. Let me read what the Head of the Office of Scientific Research and Development said when he testified before the Joint Congressional Atomic Committee of the Congress at the time the question of the ballistic missile was up; and the interesting part about this is that he did it against the recommendations of the Air Force.

While testifying before the special Senate Committee on Atomic Energy in December 1945, Dr. Vannevar Bush stated, and I quote:

We have plenty enough to think about that as very definite and very realistic—enough so that we don't need to step out into some of these borderlines, which seem to be to me more or less fantastic. Let me say this: There has been a great deal said about a 3,000-mile high-angle rocket.

BUSH SAID IT WAS IMPOSSIBLE

Let me point out to you that is not a 5,000-mile ICBM but a 3,000-mile IRBM. Continuing the quote:

In my opinion such a thing is impossible and will be impossible for many years. The people who have been writing these things that annoy me have been talking about a 3,000-mile high-angle rocket shot from one continent to another carrying an atomic bomb, and so directed as to be a precise weapon which would land on a certain target such as this city.

I say technically I don't think anybody in the world knows how to do such a thing, and I feel confident it will not be done for a very long period of time to come. I think we can leave that out of our thinking. I wish the American public would leave that out of their thinking.

I don't in any way criticize the sincerity of that statement, but it was made against the best thinking of probably the greatest airman who ever lived, Gen. H. H. Arnold; and also against the thinking of Dr. Theodore von Karman, who, in my opinion, is generally recognized as the world's leading aeronautical scientist.

Where would we be today if, when it came to weapons systems, like Polaris and Atlas, we had followed the suggestions of the head of OSRD as far back as 1945?

Dr. LIVINGSTON. This is one of the things that I did observe in other programs that bothered me when I made my recommendations.

Senator SYMINGTON. You mean you did know about this?

Dr. LIVINGSTON. No, sir, not this; but I believe it was Rutherford, who was the leading atomic scientist—

Senator SYMINGTON. Who was that?

Dr. LIVINGSTON. Rutherford—is this not correct?—was the leading atomic scientist, who said also that no good would ever come out of atomic energy.

Senator SYMINGTON. Lord Rutherford, whose assistant was Peter Kapitsa, the great Russian scientist?

Dr. LIVINGSTON. Yes. You will find if you look back that there are people who are highly creative at certain periods of time and then at other times conclude that creative things can't be done.

Senator SYMINGTON. But Dr. Bush emphasized when he recently testified before this committee that he was not a scientist, that he was not a creator, that he was an engineer. As I understand it, your plan is to take away from the services the right to decide on the development of their weapons—and I only illustrate that you might run into a little trouble, because at that time Dr. Bush was probably the most prominent scientist in the United States.

He had great authority, and the complete confidence of the American people, and as a result of this statement, plus that problem of the money check as Dr. von Braun said, what chance would you have of getting the check for the weapon that now would seem most important, if you have that type and character of opinion from the No. 1 scientist of the country?

Therefore my apprehension about one part of your statement is in the creating of in effect a fourth Service, which incidentally is just further lack of unification instead of further consolidation. You would have another department, another big department. My worry

would be how do you know you wouldn't run into something like this again; and if you did, where would our country be if the Russians had developed the ICBM, and we didn't?

Dr. LIVINGSTON. May I answer that, sir?

Senator SYMINGTON. I am through now.

Dr. LIVINGSTON. I think your point is a very good one. We cannot guarantee that we will advance as fast as we should, merely by any organizational arrangement. You may run into difficulties, and, in fact, on the hydrogen bomb I think we did run into difficulties outside the military services because of slowness in undertaking a new development. Hence you cannot assume that by setting up a new agency you can guarantee that you will avoid bad mistakes of judgment. I think it would be a very great mistake to think that the military services could not undertake the development of a new weapon, and if they saw the possibility before the scientific organization I have suggested saw it, then more power to them. Let them develop the weapon.

Senator SYMINGTON. If they what?

Dr. LIVINGSTON. If they saw the possibility of a new radical weapon before the scientific agency saw it, I would say let them go right ahead and develop it.

Senator SYMINGTON. In other words, you are creating a competitor to the three services?

Dr. LIVINGSTON. Competitor in the sense that we are competing for ideas. To justify its existence this agency has to produce new ideas which the services will take.

Senator SYMINGTON. Suppose it is created and doesn't produce any new ideas?

Dr. LIVINGSTON. Then you have wasted your money.

Senator SYMINGTON. That's right.

Dr. LIVINGSTON. That's right.

Senator SYMINGTON. Now here you have a case where a new weapon is turned down by a man who every American knows had great vision. It is turned down by the No. 1 scientist-engineer of the country. So don't you run the chance of the same problem there you would run into in the services?

DR. BUSH VETOED AIR BREATHERS

I have worked with Dr. Bush. He was Chairman of the Research and Development Board, and able. I have great respect for him. But in this case he was wrong.

As a matter of interest, the air breathers would have been canceled if Dr. Bush had had his way at one point. I think I had a little to do in preventing that myself.

But you have developed something here tonight which would make it look as if we would have a brave new world if we transfer this situation from the services to the scientists.

There is one basic problem. When you do that, you don't let the people who have the responsibility for winning a war in case we are attacked also have the vital responsibility of the weapon itself. You might find that theory as in this case prevented developing the weapon which later turned out to be the most important.

Dr. LIVINGSTON. We could not be in the first difficulty that you have mentioned because the plan that I suggested would not restrict the military services from developing a new weapon if they saw the opportunity and the need for it.

Senator SYMINGTON. In a business, if you have seven research and development departments, you are probably going to have a better line of merchandise than if you only have one?

Dr. LIVINGSTON. That is right.

Senator SYMINGTON. But the question comes up as to whether or not you can add to your fixed overhead the cost of seven research and development departments instead of taking care to pick the right line; so your company doesn't go broke because of the cost of the seven.

I am willing to agree that if we had many more research and development departments, we would probably end up with better ideas ultimately. The question is, can we afford to operate on that basis, is it not?

Dr. LIVINGSTON. Yes, sir.

Senator SYMINGTON. Let's take one more illustration.

Mr. Chairman, I am over my time and just about through. When the budgetary people years ago came to General LeMay and General Spaatz and said, "You can build either a Bison or a Bear."

You know enough about this to know what I am talking about.

Dr. LIVINGSTON. Yes.

Senator SYMINGTON. That meant, as you know, we could either build a full jet or a turboprop; so we thought for many days about it, and decided on the full jet.

The Russians compromised by building both.

You cannot criticize our not having the Bear on the grounds because we did not want the Bear.

Dr. LIVINGSTON. That is right.

Senator SYMINGTON. Nor can you criticize the Russians for building the only really long-range bomber in the world except the B-36. What you are really saying then, and I want to be sure I understand, is that you think, in addition to the services and engineering departments in the service which will use the weapon, there should be a fourth service, or organization, which would compete with them in the designing of weapons; is that correct?

Dr. LIVINGSTON. Up to the point where the services established a requirement. Now, let's assume that we were all talking about a ballistic missile, for a moment, and let's also assume that this agency was foresighted and began the development of this ballistic missile, and along came the Air Force 3 or 4 years later with a development directive. At that point responsibility for the missile should be turned over to the Air Force, and for that reason we are not duplicating anything, as I see it. Rather, we are getting it started earlier and then turning it over to the service when a need exists.

Senator SYMINGTON. I am sorry to pursue it, to labor it, but suppose the Air Force did not like the way the missile had been designed and planned for use.

Then you have lost all that time.

Dr. LIVINGSTON. Not necessarily.

Senator SYMINGTON. Not necessarily, but maybe.

Dr. LIVINGSTON. It is entirely possible this is true, but if—

Senator SYMINGTON. If it is true you may have lost your country.

Dr. LIVINGSTON. You have not delayed anything because you would not do anything in the Air Force until you got to this planning stage anyway.

Senator SYMINGTON. You have lost time which you can never recover if the Air Force knows the new organization is designing the weapon and then the weapon comes out with a design the Air Force believes unsound.

Dr. LIVINGSTON. When a development directive is approved, the services could go forward with any design they wished to go forward with. Let's say that we have at this stage a very large rocket motor such as the one that von Braun has asked for. Now it would be possible when a development directive is prepared to take that large rocket motor and proceed from there to the development of the specific weapon required by the service; and I would think this would speed up, without duplicating, the work of the services.

Senator SYMINGTON. In my opinion the trouble in the Pentagon Building is that authority and responsibility do not consistently go together. This is verified by Mr. Trevor Gardner's chart in Life magazine.

You cannot have the three things it is necessary to know in order to do a job, namely, each individual knowing who reports to him, to whom he reports, and what his functions are, with any chart like that.

Now as I see it, your suggestion is one that would further attenuate the question of responsibility and authority.

I may be wrong, and would like to have the opportunity of discussing it with you again, but I certainly don't want to see any more departments in that big building.

Dr. LIVINGSTON. You understand I did not want this organization to be in that big building.

Senator SYMINGTON. Well, then you are going to add further cost by the gasoline of people going to some other building, because they are all going to have to get together in some form of coordination, through additional committees and Commissions, boards, and so forth.

Dr. LIVINGSTON. Without pursuing this too far, let's take the situation on nuclear submarines where you have joint staffing by the Atomic Energy Commission and the Navy on certain projects.

Senator SYMINGTON. You have run your chart on the Air Force and when you get into the nuclear submarine picture, I know little about it in any real operating history.

But give me an illustration if you want to on the Air Force.

Mr. WEISL. Why don't you discuss how long it took our Air Force to build the B-52 and how long it took the Russians to build the Bison under their system?

Dr. LIVINGSTON. It took our Air Force roughly 8½ years to build the B-52.

Mr. WEISL. And how long did it take the Russians to build the Bison?

Dr. LIVINGSTON. The reported figure is 4½ years.

Mr. WEISL. So it took our Air Force twice as long as it did the Russians, and the Russians did it in an independent agency, independent of the military air force, is that not correct?

Dr. LIVINGSTON. That is correct.

Senator SYMINGTON. I am not sure that latter point is correct and I have studied the Russian situation. When the Russians decided they wanted to build the Bison, they did not have a program in January which changed in February and then changed again in March; and then changed again in May, and then, because the figure was changed in conference, it was changed again in June, and then because a ceiling was put on, it was changed again in July.

I understand there have been 63 changes in 1 major program in 1 year.

That is what I was getting at when I asked if in this interesting analysis of yours you had incorporated the question of budgetary changes.

When in charge of Air Corps research and development, General LeMay after 1 year, I believe 1946, came to me and said:

"We have spent the entire year changing the programs, reprogramming, and we have done no research and no development."

Compare that to Mr. Stalin saying "Get me a bomber."

Dr. LIVINGSTON. I would certainly agree with you that the budgetary process, which I did not talk about, contributes very significantly to the problem and to the delay.

Senator SYMINGTON. Thank you, sir.

Some years ago I made a talk, and a famous friend gave me a thought; namely, in a totalitarian state the coin of the realm is the order of the dictator.

That I believe is what we are talking about.

When they wanted the Bison, they did not have fluctuations incident to disagreements between the Hill and the administration, and the various departments in the executive branch.

They went ahead and got the Bison. I believe if you pursue this further you will find out that those reprogramming had more to do with the delays that we have in producing airplanes as against the Russians than any other single factor.

Senator JOHNSON. Have you concluded, Senator Symington?

Senator SYMINGTON. Thank you, Mr. Chairman.

I am sorry I went over my time.

Senator JOHNSON. Senator Barrett?

Senator BARRETT. Mr. Chairman, I just wanted to ask Dr. Livingston if the Russians have developed their ICBM up through the fourth step in 5 years.

Dr. LIVINGSTON. I don't know, of course, when they started.

Senator BARRETT. Didn't they start right after the end of World War II on it?

Dr. LIVINGSTON. They did not begin the ICBM, so far as I know, immediately at the end of the war. They began an intermediate range ballistic missile immediately at the end of the war.

Senator BARRETT. Then they took 10 years on the IRBM.

Dr. LIVINGSTON. Now comes the question of where is the IRBM in this schedule? And the IRBM may very well be in inventory at this point.

Senator BARRETT. Even if that is the case, that is 10 years.

Dr. LIVINGSTON. That is right. It might be in inventory at this point.

Senator BARRETT. You would still be 5 years off, would you not?

Dr. LIVINGSTON. That would depend upon when it started to go into inventory.

Senator BARRETT. That is true, but take the ICBM, anyway. They claim, themselves, that they fired the first one in August, so it is certainly beyond the 5 years, and something between 5 and 10 years, anyway. So it seems to me your figures are off a bit there on that.

Dr. LIVINGSTON. May I say this: I think you have made a good point. These are average figures and will not hold for any one weapons system. The ICBM is a more complicated weapons system than an airplane.

Senator BARRETT. There is no doubt about that.

Dr. LIVINGSTON. Hence, we do expect the cycle to be longer.

Senator BARRETT. Would you say that General Schriever has eliminated a lot of the defects in the program, even as far as manned aircraft is concerned, with both the IRBM and the ICBM, by consolidating the Air Research and Development with the Air Materiel Command out there in his headquarters?

Dr. LIVINGSTON. Well, the two weapons systems project officers normally work together in this manner. I think the granting of authority at the top of an ARDC structure to the ballistic missile weapons system project office has done a great deal to help that program; yes, sir.

Senator BARRETT. Could they not perfect that division out there by taking some of these suggestions you have made here, if they had the money to take the chances that you suggest are proper there, by several prototypes instead of one?

Dr. LIVINGSTON. Yes, sir; I think they can do a great deal to speed it up, and I hope that I did not imply that the military services could not do things to speed up their own process, particularly if they were given funds for alternate development.

Senator BARRETT. I think you have made a very good statement. It is very provocative, and probably will do a lot of good. But on the whole, I believe that they could have done a much better job if they had had the money; if the Congress would have given it to them.

Dr. LIVINGSTON. I certainly agree, sir.

Senator BARRETT. Thank you very much, Mr. Chairman.

Senator JOHNSON. Doctor, would you remove the development of the ICBM and the IRBM from the services right now and put them in your new agency?

Dr. LIVINGSTON. No, sir; I certainly would not. I think the services as a whole are doing a very good job of developing the immediate weapons, and I think they normally do a good job.

Senator JOHNSON. How would you make the transition from the present development to your new agency, in the case of these two important—

Dr. LIVINGSTON. I would give to this agency the same kinds of things that the Air Force apparently intended to give to their directorate of astronautics and the Department of Defense to its advance research group, namely, space vehicles and the advanced outer-space research and development. That is what I would give—not anything that is an immediate weapon—I think that would be a tragedy.

Senator JOHNSON. What you are saying is that you could get going a lot faster if you put it in a separate agency?

Dr. LIVINGSTON. I think you could get started a lot faster; yes, sir.

Senator JOHNSON. And get the end result a lot faster?

Dr. LIVINGSTON. Yes, sir; that is correct.

Senator BUSH. Mr. Chairman, I presume these charts will go in the record at an appropriate place. I do not know that they were ordered in. They should be, don't you think?

Senator JOHNSON. Without objection, we will include them at the appropriate place in the record.

Counsel, do you have any more questions?

Mr. WEISL. In fairness to you, Doctor, you were not suggesting your method as the only method?

Dr. LIVINGSTON. No. I tried to emphasize that.

Mr. WEISL. You are suggesting that the Russians, with an independent agency, on the average are able to produce about twice as fast as we are, and you were seeking and searching some provocative way to get us to think about this absolutely all-essential way to catch up with the Russians. We cannot afford the luxury any longer; is that right?

Dr. LIVINGSTON. Yes, there is one thing that I think has been lost sight of in our questioning, and that is that we should not necessarily wait for a weapon requirement before we push our research and development.

Senator JOHNSON. Dr. Livingston, it might be well for this committee to give serious consideration to the constructive suggestions you have made. I would not want to embrace them all, and I realize that Senator Symington has made some very good points here, and I am sure you realize it. He has had a wealth of experience in this field. But he also got into the field that I have had some experience in. When you get through reorganizing the Defense Department and getting this new agency set up, then I hope you will undertake a study for Senator Symington of reorganizing the Congress and the 63 changes made in the authorizing committees, the appropriation committees, the conference committee, and the House and Senate. The democratic procedure which we follow up here is the reason why General LeMay spent most of his year changing things instead of getting research and development.

I was working with the then Secretary Symington and General LeMay to try to keep them from doing that, but we had authorizing committees and then we had appropriations committees and then we had conference committees to deal with. So when we talk about the committee system in the Pentagon we also have a committee system here, committees on top of committees on top of committees.

We appreciate very much your recommendations to us. We will seriously consider them. We may want to ask you to elaborate on them and supplement them from time to time.

Do keep that congressional reorganization in mind because we put one through in 1945 I believe, or about that, time. It looks like every time we reorganize, we get a little more complicated.

Senator Symington.

Senator SYMINGTON. Mr. Chairman, let me assure Dr. Livingston, as I started off my comments I was very much impressed with many of the things he said. I congratulate you, Doctor, for the very able and excellent study you made here of this subject.

The fact I do not agree with you on all points does not mean I do not agree with you on most.

As I understand it, following the chairman's question about ICBM, IRBM, you would in effect, take the space situation above IRBM, above ICBM, and put that in a separate agency; is that right.

Dr. LIVINGSTON. Yes, sir; I think that is correct.

Senator SYMINGTON. Well, not to be facetious, but, as you know, one problem with Polaris is going to be how deep can be the water depth you fire it from. The ocean is very deep, and the deeper you can fire it from, a weapon of that character, the better it would be.

Would you put into a new agency instead of the Navy anything below, say, a thousand feet in the water, just like you would take, from the Air Force, anything above, say, 20 miles in the air?

NEW AGENCY WOULD WORK ON WEAPONS OF THE FUTURE

Dr. LIVINGSTON. Well, except for the space problem, I wouldn't take anything away from the military services. I would try to have the new agency work on things the military services are not conceiving or working on at the present time.

Senator SYMINGTON. Don't you think the military services are conceiving and working on the space problem?

Dr. LIVINGSTON. They are working on some parts of it, but from the testimony that I have heard, it seems to me that it has a relatively low priority—in fact, this was stated today—has a relatively low priority behind the missile program.

Senator SYMINGTON. Thank you, Doctor.

Senator JOHNSON. Dr. Livingston, the committee wants to thank you for your very fine testimony. I think you have made an excellent contribution to our hearing. We look forward to working with you in the future, and we appreciate very much the time and attention you have given this subject and your willingness to come here and be as helpful as you could.

We think that you have performed an outstanding patriotic duty, and you are excused.

Dr. LIVINGSTON. Thank you.

(On January 11, 1958, Dr. Sterling Livingston addressed a letter to the chairman of the Preparedness Investigating Subcommittee, which is as follows:)

HARVARD UNIVERSITY,
GRADUATE SCHOOL OF BUSINESS ADMINISTRATION,
Boston, Mass., January 11, 1958.

Senator LYNDON B. JOHNSON,

Chairman, Preparedness Investigating Subcommittee, Committee on Armed Services, United States Senate, Washington, D. C.

DEAR SENATOR JOHNSON: I have reviewed my testimony to the Preparedness Investigating Subcommittee, and after reflecting on the questions which were raised by the members of the subcommittee. I should like to submit the following supplementary statement and recommendation.

It is generally agreed, I believe, that in order to regain undisputed weapons superiority, it is essential that the United States reduce the lead time required by its weapons development process and accelerate the scientific and technological advances on which radically new weapons depend. The action that must be taken to achieve this end, however, has neither been agreed upon nor clearly defined. Therefore, I wish to recommend that an emergency Commission on Technological Mobilization be established (1) to formulate a national scientific

policy which will insure that our technology advances faster than that of the Soviets, (2) to outline a plan for an advanced scientific research and development agency outside of the Department of Defense, and (3) to propose a legislative and executive program to reduce weapons development lead time by speeding up the military decision making process, the military procurement process, and the budgetary process. The Commission on Technological Mobilization, like the second Hoover Commission, should be composed of members appointed from the executive branch of the Government, the Senate, and the House of Representatives, as well as from private life.

REAPPRAISAL OF WEAPONS DEVELOPMENT PROCESS NEEDED

The underlying reason for our loss of weapons superiority is that, unlike the Soviets, we have placed responsibility for weapons development solely in the hands of our military services. Our weapons development process has been built on the faulty premise that research leading to the development of new weapons must be based on the strategic or tactical concepts of the military services, when the reverse is actually closer to the truth. New strategic and tactical concepts are usually devised to use the weapons which scientific and technological advances have made possible. While improvements in conventional weapons may result largely from recognized military requirements, radically new weapons primarily grow from scientific and technological developments rather than strategic or tactical concepts. The development of our three present major weapons—the atomic bomb, the airplane, and the submarine—demonstrates this fact.

The atomic bomb was undertaken when independent scientists recognized its feasibility and convinced the President that the necessary resources should be devoted to its development. Although the atomic bomb did not grow out of a recognized military requirement, it has fundamentally altered military strategic and tactical concepts. The airplane, which has played such a dominant role in military operations, was also invented without benefit of a recognized military requirement. The wellknown story of Gen. Billy Mitchell testifies to the initial resistance within the services to the airplane as a major military weapon. Even the submarine, which is solely a military weapon, was not developed to meet an established naval requirement. It was developed in this country by private individuals who were unable to sell it to our Navy. They did, however, succeed in interesting European navies, and the Germans were the first to employ it on a large scale.

A major reason for delay in our present weapons development process is that the military services do not undertake large-scale research efforts until a requirement for a new weapon has been established. Yet, as I have pointed out, radically new weapons have seldom been developed to fill an established military requirement; rather, the requirement has been established after the weapon has been developed or become feasible. As Dr. James R. Killian, Jr., has stated, it is unreasonable to expect that ideas for radically new weapons will come from the military services. Testifying before a subcommittee of the Armed Services Committee, Dr. Killian said:

"As the Hoover Commission Report on Research and Development commented, the military services have not distinguished themselves in the initiation of radically new approaches to weapons systems.

"There are striking exceptions to this, but it could hardly be expected that the really radical approaches would come from within the services.

"They must originate in the creative basic research that takes place in the universities and other institutions where the fundamental new ideas are most likely to be generated."

The development of our ballistic missiles further illustrates the central role of science and technology in weapons development. Senator Symington, in questioning my recommendation for the establishment of an independent scientific research and development agency, pointed out that the former head of the Office of Scientific Research and Development opposed the development of a long-range ballistic missile program in 1945. Senator Symington's statement emphasizes the fact that scientific administrators are not infallible and that great care must be exercised to avoid domination of research and development by groups dedicated to a single scientific approach or point of view. I believe, however, that the important lesson to be learned from the delays in our ballistic missile program is that radically new weapons

will be not developed until their feasibility is determined by outstanding scientific and engineering experts. For example, the Air Force did not assign high priority to the development of the intercontinental ballistic missile until that recommendation was made by the Strategic Missile Evaluation Committee. This Committee was composed of leading, independent scientists, under the chairmanship of Dr. von Neumann of Princeton University. And it was not until the Killian report was submitted to the National Security Council that top national priority was given to our ballistic missile programs. It seems reasonable to conclude, therefore, that the development of radically new weapons depends primarily on the recognition of their scientific and technological feasibility, which, in turn, depends on scientific and technological advances or breakthroughs.

In placing responsibility for development of radically new weapons in the hands of our military services, we are clearly putting the military cart before the scientific and technological horse; in tying weapons research and development to military requirements, we are pursuing a self-defeating policy. Large-scale research and development programs typically are not undertaken by the military services until a requirement for a new weapon is established; a requirement for a new weapon, on the other hand, is not established until its scientific and technological feasibility is recognized. There is bound to be serious delay in weapons development unless a vigorous, long-range research and development program can be undertaken without waiting for the military services to establish requirements for new weapons.

The Soviets' earth satellites and ballistic missiles are being developed by the Soviet Academy of Sciences—not the Soviet Ministry of Defense—indicating that they have recognized the central role of science and technology in weapons development. The Soviets also have established a scientific research and development policy that effectively supports their national objectives. In order to meet the competition of Soviet science and technology and to match their weapons development lead time, we must formulate a new national scientific policy and engage in an expanded, long-range research and development program.

REVIEW OF NATIONAL SCIENTIFIC POLICY AND ORGANIZATIONS NEEDED

The problems posed by Soviet scientific and weapons developments cannot be met solely by increasing military research and development expenditures, or by establishing the Advanced Research Projects Agency within the Department of Defense. Weapons development is not our sole national objective, nor is the creation of more destructive weapons the only justification for scientific research and development. The conquest of outer space, for instance, is a scientific goal as well as a military goal. Dr. Teller testified before this subcommittee that the earth satellite program opened the possibility of such scientific advances as accurate forecasting and control of weather, and other scientists have stated that the satellite is of great significance in such fields as the study of cosmic radiation. Clearly, the forecasting and control of weather and the study of cosmic radiation should not be the sole province of military research and development. In our atomic energy program we have recognized that the industrial applications of atomic energy are equally as important as the military applications and, therefore, have established a national policy on atomic energy and the Atomic Energy Commission, which is independent of the military services.

The Commission on Technological Mobilization, which I have recommended, should review the role of the National Science Foundation in the formulation of national scientific policy and formulate a new statement of policy to ensure our technological advancement at a faster rate than that of the Soviets and to support our national objectives. The President's recently announced program for the training of scientists and engineers emphasizes this need for a national scientific policy and a long-range research and development program. If, in the future, we train substantially larger numbers of scientists and engineers, we should not rely solely on military research and development for their continued employment. The recent cutback in military expenditures showed clearly that a real, or imaginary, easing of world tension might eliminate a high percentage of the jobs requiring scientists and engineers. It is neither wise policy, nor entirely fair to the individuals involved to undertake an extensive program for the training of scientists and engineers and then base their subsequent employment on the continuation of an arms race.

In outlining a plan for an advanced scientific research and development agency outside the Department of Defense, the Commission on Technological Mobilization should define the functions of this agency and its relationships to the National Science Foundation; the Atomic Energy Commission; the Department of Health, Education, and Welfare; the Department of State; and the Department of Defense.

The clear division of responsibility between a new advanced scientific research and development agency and the Department of Defense would, of course, be essential. The Commission on Technological Mobilization would be expected to determine the areas of research and development to be conducted by the military services and suggest procedures for the establishment of proper liaison between the military services and a scientific research agency.

A major benefit to be derived from this new agency would be the elimination of duplication in research and development effort by the military services and the avoidance of interservice rivalry. The Atomic Energy Commission, for example, has been able to avoid competition between the services in the development of atomic weapons. Without the Commission, the Army, Navy, and Air Force might have generated their own atomic development programs. Duplication could be similarly avoided in the development of missiles, the earth satellite, space vehicles, and other weapons.

REDUCTION IN WEAPONS DEVELOPMENT LEAD TIME NEEDED

In order to keep pace with the Soviets, it is essential that the United States reduce its weapons development and production lead time from the present average of from 10 to 11 years, to not more than 5 years. This reduction in lead time depends on fundamental changes in the following areas:

The weapons decisionmaking process.—The wide division of authority and responsibility for weapons development within the military services and the complex organizational structure of the Department of Defense are also major causes of delays in weapons development. As I have previously suggested, a way must be found to bypass the existing decisionmaking process; and weapons system management agencies must be established within our military services, with full authority for weapons design, development, and production.

The military procurement process.—Because of our time-consuming military procurement process, this Nation loses much valuable time in weapons development, as compared with the Soviets. Our requisitioning and contracting procedures—involving, as they do, the solicitation and evaluation of proposals, the negotiation of contractual terms, and the review and approval of contractual documents—coupled with the division of technical authority between our military services and our weapons contractors, shackle this Nation's weapons development process with functions that do not exist under the Soviet system. Senator Saltonstall asked, during my testimony, whether the delays in the military procurement process were not due to requirements imposed on the military services by laws such as Public Law 413 of the 80th Congress. Although I could not recall the law by number at that time, Senator Saltonstall's observation was quite correct. In order to speed up the weapons procurement process and reduce procurement lead time, changes must be made in our procurement laws, as well as in the procurement procedures of the military services. For example, the legal and administrative procedures now required to negotiate military contracts must be simplified.

The budgetary process.—Senator Symington questioned whether in my original testimony I had given sufficient attention to the budgetary process and the effect of reprogramming on delays in weapons development. This criticism was entirely appropriate; I did not, in my testimony, place proper emphasis on delays caused by our budgetary process. The length of time which the military services require to prepare their budget estimates, the complex procedures for review and revision of budget requests within the Department of Defense and the Bureau of the Budget, and the apportionment process, together with the ability to withhold funds appropriated by Congress, are sources of major delay in weapons development.

SUMMARY

The problems that now confront our Nation are enormously complex. The improvements in our weapons development process which are so urgently needed cannot be brought about by independent action on the part of either the military services, the executive branch of the Government, or the Congress alone. New

military organizational concepts and management methods, new relationships between the military services and weapons contractors, and greatly simplified budgetary procedures must be devised. In addition, a farsighted national science policy, a long-range research and development program, and a new research and development agency must be created. Since a great deal of thought and work will be required to determine the changes which must be made, I am suggesting that an emergency Commission on Technological Mobilization be established.

I am pleased to have had the opportunity to testify before the Senate Preparedness Investigating Subcommittee and hope that my testimony has contributed to its analysis of the delays in our ballistic missile and earth satellite programs.

If I can be of any further assistance to the subcommittee, I hope you will let me know.

Very truly yours,

J. STERLING LIVINGSTON,
Professor of Business Administration.

Senator JOHNSON. I should like to announce to the committee—

Mr. WEISL. May we have Admiral Raborn back for two questions?

Senator JOHNSON. Is there any guaranty that you will have only two questions for Admiral Raborn? We had two since 5:45.

Admiral Raborn, we have two questions for you.

We will have the Air Force tomorrow, and we hope to conclude with them. We will start with the Secretary at 9:30.

Mr. VANCE. Since you testified, Admiral Raborn, a letter has come in from the contractor on the Polaris, which raises two questions I would like to put to you.

Perhaps I misunderstood your testimony, but I thought you had testified the program had proceeded as fast as possible, and there was no delay.

I would like to read to you one paragraph from that letter which reads as follows:

The contractors has operated at the maximum rate permitted by the funds available. Had there been additional moneys available, the schedules for development and testing could have been set at a faster pace.

Would you like to comment on that?

Admiral RABORN. Yes; I would be pleased to.

As you know, the funds which are made available by the Congress are, in turn, they go through an apportionment process before they come to the users; that is me, the user.

Now, there have been delays in getting these funds made available on a schedule, which I personally would like to get them and, in turn, to the contractors.

Mr. VANCE. Well, what was this delay? You mentioned to me a 5-percent cutback. What cutback was that?

Admiral RABORN. Well, on August 14 of this year, the Secretary of Defense exercised a 5-percent cut on the Polaris program, and that, in turn, of course, caused me to change my plans for the development of it, and to slow down the program appropriately in various lines of endeavor to keep in conformance with the amount of money, the spending rate, which I have.

Mr. VANCE. That delayed your program?

Admiral RABORN. It delayed us, sir, because it took the form of amendments to the contract, changes in plans, and so forth.

Mr. VANCE. When was that cutback taken out?

Admiral RABORN. It was taken out October 8. It was rescinded, the order cutting us 5 percent.

Mr. VANCE. I would like to read you one more paragraph.

Change orders have delayed the Polaris development. The complexity of governmental procedures for processing changes are costly in time and effort.

Would you comment on that?

Admiral RABORN. I certainly would like to. This is a problem which I thoroughly agree with the contractor therein. By law, in order to protect the Government and, of course, the people, certain laws have been made up as to how you go about letting contracts and negotiations, and so forth. We have been in business of actually letting contracts since April 1 of this year, and the slow laborious processes which are possibly quite adequate for normal programs, are not suited for an urgent program. We have attempted to get some relief, and I am very happy to say that the Assistant Secretary of Navy for Materiel, under whom has a large portion of the interpretation of the law, and how we can do business, has taken a most enlightened approach. He has given me some streamlined means of letting contracts. I am quite happy with this response to our request for relief from these laws.

Mr. VANCE. So that then you have taken steps to remedy this problem indicated in this letter?

Admiral RABORN. Yes, sir; I think I can put it to work as fast as anybody can give it to me.

Mr. VANCE. Thank you very much, Admiral.

Senator JOHNSON. Thank you, Admiral. We appreciate very much your testimony before this committee, and you are now excused.

The committee will take a recess until 9:30 a. m. when we will hear the Secretary of the Air Force and the Chief of Staff of the Air Force, Secretary Douglas and General White.

(Whereupon, at 7:40 p. m., the subcommittee recessed to reconvene at 9:30 a. m., on Tuesday, December 17, 1957.)

INQUIRY INTO SATELLITE AND MISSILE PROGRAMS

TUESDAY, DECEMBER 17, 1957

UNITED STATES SENATE,
PREPAREDNESS INVESTIGATING SUBCOMMITTEE
OF THE COMMITTEE ON ARMED SERVICES,
Washington, D. C.

The subcommittee met, pursuant to recess, at 9:30 a. m., in room 318, Senate Office Building, Senator Lyndon B. Johnson (chairman of the subcommittee) presiding.

Present: Senators Johnson (Texas), Kefauver, Stennis, Symington, Bridges, Saltonstall, and Flanders.

Also present: Senators Bush and Barrett, members of the Committee on Armed Services;

Edwin L. Weisl, chief counsel; Cyrus R. Vance, counsel; Gerald Siegel, associate counsel; Solis Horwitz, associate counsel; Daniel F. McGillicuddy, associate counsel; Stuart P. French, associate counsel; Dr. William Houston, consultant; Dr. Homer Joe Stewart, consultant; and Edward C. Welsh, staff adviser.

PROCEEDINGS

Senator JOHNSON. The committee will come to order.

Our list of witnesses this morning are: the Honorable James H. Douglas, the Air Force Secretary, accompanied by Gen. Thomas D. White, Air Force Chief of Staff.

Mr. Secretary, will you and Chief of Staff General White please stand and let me administer the oath separately.

Secretary Douglas, do you solemnly swear that the testimony you will give this committee will be the truth and the whole truth?

Secretary DOUGLAS. I do.

Senator JOHNSON. Be seated.

General White, do you solemnly swear that the testimony you will give this committee will be the truth and the whole truth?

General WHITE. I do.

Senator JOHNSON. Today we are going to hear the Secretary of the Air Force and the Chief of Staff of the Air Force and his staff of Air Force experts.

We are delighted Mr. Secretary, that you have the very able general, Chief of Staff General White, with you. This testimony will conclude the current series of hearings. That is, when the Air Force completes its testimony today, as we announced yesterday, the committee will take a recess until January 6.

Meanwhile, the staff will have a very heavy burden laid upon its shoulders. While the committee is in recess, staff members plan lengthly

interviews with the scientists and industrial leaders throughout the country. We are going to try to consolidate their interviews so that on January 6 we can return and receive a comprehensive picture of the situation as it is seen by those who are outside of the Government but who are directly involved in this problem.

I want to take this opportunity to compliment Mr. Weisl and his very competent staff. It has been my experience that thorough and complete staff work means that hearings can proceed with much greater speed and greater ease. I doubt whether any staff in the history of the Congress that I have been associated with for more than 26 years has done a more thorough job than that done under the direction of Mr. Weisl.

We now have the first witness, the Secretary of the Air Force.

Secretary Douglas has been Secretary of the Air Force since last May 1. Prior to that he had served as Under Secretary of the Air Force from March 3, 1953.

An attorney by profession, Secretary Douglas served 3½ years in the Air Force during World War II. During most of his service he was deputy chief of staff of the Air Transport Command and completed his service as chief of staff, Air Transport Command.

Prior to his appointment as Under Secretary of the Air Force, Mr. Douglas was a member of a Chicago law firm.

(The biography of Secretary Douglas is as follows:)

JAMES H. DOUGLAS, SECRETARY OF THE AIR FORCE

James H. Douglas was nominated by President Eisenhower to be Secretary of the Air Force on March 26, 1957, and was sworn into office by the President on May 1, 1957. Secretary Douglas had been serving as Under Secretary of the Air Force since March 3, 1953.

Prior to his appointment as Under Secretary, Mr. Douglas was a member of the law firm of Gardner, Carton & Douglas, of Chicago, Ill.

Secretary Douglas was born in Cedar Rapids, Iowa, on March 11, 1899. During 1918 he was on active duty as an Army second lieutenant at Camp Hancock, Ga. He received his bachelor of arts degree from Princeton University in 1920, studied at Corpus Christi College, Cambridge, England, for 1 year, and in 1924 graduated from the Harvard Law School.

Mr. Douglas was admitted to the Illinois bar in 1925 and practiced at Chicago with the law firm of Winston, Strawn & Shaw. In 1929 he joined Field, Gloré & Co., investment bankers. From March 1932 to June 1933 he served as Assistant Secretary of the United States Treasury, and in 1934 became a member of the Gardner, Carton & Douglas law firm.

During World War II Secretary Douglas served 3½ years as a major, lieutenant colonel, and colonel in the Air Force. During most of this service he was deputy chief of staff of the Air Transport Command, and he completed the period as chief of staff, Air Transport Command. He was awarded the Distinguished Service Medal.

In 1946, Mr. Douglas returned to Gardner, Carton & Douglas, and from 1946 to 1948 was also a member of the law firm of Douglas, Proctor, MacIntyre & Gates, of Washington, D. C.

Prior to his appointment as Under Secretary, Mr. Douglas was a director of the Metropolitan Life Insurance Co., the Chicago Title & Trust Co., American Airlines, Inc., and the Chicago Corp. He is a member of the board of trustees of the University of Chicago.

Senator JOHNSON. Gen. Thomas D. White has been Chief of Staff for the Air Force since July 1 of this year. Prior to that he had served 4 years as Vice Chief of Staff.

General White has served with distinction, both in this country and overseas, since his graduation from the Military Academy in

1920. During World War II, he saw duty as deputy commander of the 13th Air Force, commander of the 7th Air Force, and chief of staff of the Pacific Air Command in Japan. Later he assumed command of the 5th Air Force in Japan.

He has been Director of Legislation and Liaison in the Office of the Secretary of the Air Force; the Air Force member of the Joint Strategic Survey Committee in the Office of the Joint Chiefs of Staff; director of plans, Headquarters, United States Air Force, and Deputy Chief of Staff, Operations, for the Air Force.

(The biography of General White is as follows.)

GEN. THOMAS D. WHITE, USAF

General White is Chief of Staff for the United States Air Force.

He was born in Walker, Minn., on August 6, 1901. He was graduated from the United States Military Academy on July 2, 1920.

He was graduated from Advanced Flying School at Kelly Field, Tex., in September 1925. From June of 1927 when he was assigned to duty as a student of the Chinese language in Peking, China, until August 1940, when he was named Chief of the United States Military Air Mission to Brazil, General White had many important assignments including assistant military attaché for air to Russia, Italy, and Greece.

Returning to the United States in March 1942, General White was appointed assistant chief of staff for operations of the 3d Air Force at Tampa, Fla., and subsequently named chief of staff. Reassigned to Air Force Headquarters in January 1944, he became Assistant Chief of Air Staff for Intelligence.

Proceeding to the Southwest Pacific in September 1944, General White assumed duty as the deputy commander of the 13th Air Force. The following June he assumed command of the 7th Air Force. That October he was appointed chief of staff of the Pacific Air Command in Tokyo, Japan. One year later, in October 1947, General White took command of the 5th Air Force in Japan.

General White became Director of Legislation and Liaison in the Office of the Secretary of the Air Force in October 1948. He was appointed, in May 1950, Air Force member of the Joint Strategic Survey Committee in the Office of the Joint Chiefs of Staff. He was assigned as Director of Plans, Headquarters, United States Air Force, in February 1951, and in July 1951, assumed duties of Deputy Chief of Staff, Operations, for the Air Force.

General White was designated Vice Chief of Staff on June 30, 1953, becoming Chief of Staff for the United States Air Force on July 1, 1957.

His decorations include the Distinguished Service Medal, Legion of Merit with 1 oak-leaf cluster, and Air Medal with 1 oak-leaf cluster.

Senator JOHNSON. Mr. Secretary, you have a prepared statement. Will you proceed with your statement?

TESTIMONY OF HON. JAMES H. DOUGLAS, SECRETARY OF THE AIR FORCE, AND GEN. THOMAS D. WHITE, CHIEF OF STAFF, UNITED STATES AIR FORCE

Secretary DOUGLAS. Mr. Chairman, I have a statement which I would like to read, if I may, sir.

Mr. Chairman and members of the committee, it is my understanding that this committee is primarily interested in that part of our military structure that concerns surface-to-surface ballistic missiles and the satellite programs with their evolution into space flight. So, in these brief remarks, I propose to limit myself to these weapons systems in the context of the missions that have been assigned to the Air Force. I consider the matters you are investigating of great importance to our national security, and it is in the national interest that you should be going into them thoroughly.

First, I want to make clear a matter of general attitude. The men of the Air Force are not only openminded to the introduction of new and radical weapons systems but are, as they traditionally have been, insistent on pushing the development and integration of new and more effective weapons as fast as technological and economic factors permit.

This is no new experience to Air Force people, including the experience of introducing weapons systems which drastically reduce the requirement for flying personnel. The atomic bomb relegated to history the World War II mass formations of B-17's, B-24's, and B-29's, each with an aircrew of 10 or more. Nuclear weapons permitted the substitution of much smaller numbers of B-36's and B-47's and B-52's, with reduced requirements in numbers of aircrews.

As the IRBM and ICBM develop from experimental prototypes to operational weapons in units, there will be a further evolution in the direction of reduced flying personnel. I find in my service a determination to press forward with the introduction of these missiles systems as rapidly as this can be accomplished without loss of the effectiveness of our striking force in being.

As General LeMay has put it, whenever we can, with equal effectiveness, substitute men on the ground pressing buttons for men in the air facing enemy nuclear weapons, we shall do so.

Today, our principal concern is to maintain the military strength which provides an effective deterrent against an aggressor. Today, our Army, Navy, Marine Corps, and Air Force constitute a deterrent which even the most foolhardy aggressor should respect.

The Strategic Air Command is a main element of our deterrent force. With the swiftly moving technological development, the maintenance of a deterrent force has required a rapid succession of new weapons, with the old passing out as the new are phased in. SAC, for example, since World War II has gone successively from the B-29 to the B-50, B-36, B-47, and now to the B-52. Each one of these weapons has followed or will follow a familiar evolutionary pattern; a first phase of limited operational usefulness caused by exasperating mechanical failures, a second phase of weapon maturity with improvements designed to increase effectiveness, and a third phase of gradual obsolescence as a more advanced weapons system became available.

Ballistic missiles are viewed by the Air Force as continuations of this evolutionary process. Three principles must be constantly kept in mind.

First, we must push the development and integration of the weapons of tomorrow at a pace which permits our scientists and technicians to operate effectively.

Second, while a new weapons system is being phased in—whether it is the B-52, B-58, or a ballistic missile launched from the ground or from an aircraft—we must maintain the deterrent force with the weapons of today.

Third, we must press forward with projects for the weapons of day after tomorrow even though we cannot clearly see precisely how those weapons will operate. To illustrate, let us remember that 54 years ago today the Wright brothers flew the first powered aircraft. It was many years before its military implications were realized. In the late 1940's jet bombers were the weapons of tomorrow and

ballistic missiles the weapons of day after tomorrow. At that time rocket development was not promising because of the great weight of the atomic warhead; then, when a scientific breakthrough produced a relatively small thermonuclear warhead, we were able to press forward with ballistic-missile development.

The present-day analogy is, of course, satellites and space flight, where Air Force studies started in 1946 have led to present programs of great possibilities.

Now, doing all three of these things—maintaining a force in being with today's weapons, developing and phasing in tomorrow's weapons, and conducting research upon the weapons of day after tomorrow—is a very expensive business. Each new weapon seems to cost more than its predecessor. I wish I could tell you that there has been a time when we could meet all three requirements easily. That is simply not the way the realities of life work out. We are constantly having to make hard choices.

In maintaining a combat-ready Air Force with the weapons of today we must accelerate the alert program of the Strategic Air Command, we must deploy our tanker force more efficiently, and we must further disperse SAC's strike units. To modernize with the weapons of tomorrow, we must accelerate IRBM and ICBM operational capabilities and plan overseas deployment of IRBM units as a coordinated part of the SAC striking force. For the day after tomorrow that is all too close we must continue to push forward to achieve military and scientific capabilities in the higher atmosphere and space.

In our research and development program, the Air Force is concerned that the capability of our present-day forces will continue to mount at an increasing rate as the result of our technical efforts. To avoid speaking in generalities, I would like to discuss briefly a few of our weapon systems now under development.

Although the ICBM's and IRBM's we are now testing represent a large step forward in strategic weaponry, we see ways to improve greatly the current types. Smaller missiles using solid propellants and simplified operational systems will result in faster firing missiles and greater mobility and greatly simplify the base-hardening problem.

Furthermore, the relatively lower costs of both missiles and operational bases will permit development in larger numbers and increase military effectiveness.

AIR FORCE EXPLORATIONS IN OUTER SPACE

In a related area, the Air Force has been engaged in explorations of outer space and all of the associated technical fields since the end of World War II. In cooperation with the NACA, we have had a continuous program in research aircraft with the objective of experimental flights at ever-increasing speeds and altitudes. It was with the first of these aircraft, the X-1, that man, in 1947, first exceeded the speed of sound. With the X-2 man first soared to altitudes of more than 20 miles. The current model of these aircraft under development is the X-15 which should permit man to fly at speeds greater than 1 mile each second and at altitudes above 100 miles.

I recount this continuity of development efforts to illustrate the fact that there is no easily recognized boundary between the atmos-

phere and space. The one merges into the other and we must learn to use both. The techniques and actual developments involved in the X-15 are one path to man's flight into space. The X-15 is a step toward a manned satellite.

SEEKING ROCKET ENGINES OF GREATER THRUST

Toward this objective, requiring greatly increased thrust, the Air Force is actively engaged in experimental investigation of many different propellants and rocket engines with a much larger capability than those currently in use. We have also been actively engaged in nuclear-power propulsion for the past 10 years.

The very major program of development of a nuclear-propulsion engine for an aircraft has resulted in the creation of a wealth of knowledge in the technique of converting nuclear energy to propulsive force. The Air Force together with the Atomic Energy Commission, is now engaged in putting this knowledge to work, in the experimental development of nuclear rockets and nuclear ramjets, both of which might be applied to future missile developments and for penetrating farther into space.

The defensive mission also comes in for a great deal of attention in our research and development program. Radar, computers, and automatic data-handling systems are being improved and new concepts are undergoing experimentation.

The detection and tracking of enemy ICBM's is recognized as one of the most difficult problems in our radar development program. We now have experimental radars deployed to observe flights of our own missiles and gain experimental data on atmospheric phenomena that are important to the design of sets to be deployed in an antimissile-warning system. Together with the other military services we are also measuring the effects of nuclear weapons detonated at high altitudes to determine their military characteristics.

These are a few of the more important of our research and development projects. They certainly could not be carried out without the benefits of an extensive basic research program. This program is carried out largely by contracts with the educational and research institutes of the United States and the NATO countries as an effort to push back the frontiers of knowledge.

The program is organized on the basis of scientific areas of interest. We have learned by experience that new military development possibilities frequently spring from unanticipated sources.

As to specific weapons, we believe that we are on the right track with the Thor as an intermediate-range ballistic missile. The Air Force is scheduled to have its first Thor squadron deployed in the United Kingdom in December of 1958.

As a part of the accelerated IRBM program the Air Force will organize and man Jupiter squadrons as well as Thor squadrons. As you know, production of both missiles has been directed.

In connection with making our accelerated program effective, the Secretary of the Army, Mr. Holaday and I, with staff personnel, have visited Redstone Arsenal and a Chrysler plant in connection with the Jupiter and yesterday were at the Douglas plant in Santa Monica where Thor is produced.

As long ago as December 1955 we made the decision to tool up for production of Thor feeling that enough information was at hand to warrant a program based on components designed and fabricated to operational standards.

In view of the Soviet potential threat, we at that time concluded that the advantage of shortening the time to production was worth the risk involved. As a consequence, a production complex is today in being and capable of early quantity production.

We have proceeded similarly in development, and preparation for production, of the Atlas, ICBM, and the Titan, which is of more advanced design and about a year behind Atlas in time. As in the case of the IRBM, a larger operational capability, earlier, is now being programed for Atlas, although this will be subsequent to the IRBM operational capability.

Our Ballistics Missile Division under General Schriever was especially created for these long-range missile projects under streamlined administrative channels within the Air Force and is so set up that the Ballistics Missile Division is virtually a Manhattan project in itself. The Division is well organized to work with any new agency given responsibility for new projects that may be assigned to it.

In the research and development of missiles, the Air Force has not attempted to tackle the problem alone. The Air Force has used the talent and ingenuity of science and industry as well as the imagination, concepts, and development of the other services.

The Sidewinder missile, for example, an effective air-to-air missile developed by the Navy, is carried by Air Force aircraft today. The Navy is using the Air Force developed X-17 test missile for testing components of the Navy's Polaris missile program.

The Air Force is providing the rocket engines powering the Army's Redstone and Jupiter missiles; and the structural studies and air-frame developments in the Air Force's Thor missile have been utilized by the Army to modify the airframe of the Army's Jupiter missile.

Similarly, information revealed by Jupiter tests have provided data useful to the Thor program. These are examples of interservice cooperation in the Nation's missile program.

The Korean war alerted us to the need for a strong military posture in what has been best described as an age of peril. The Soviet satellites are warning signals of a new perilous situation—one which calls for increasing greatly our efforts to achieve scientific and technical excellence in our educational system, in industry, and in our military services.

We have heeded these warning signals and have taken steps to accelerate our ballistic missile programs and increase the capabilities of our strike forces. I am confident that we can do the job facing us.

Senator JOHNSON. Thank you, Mr. Secretary, for a very informative statement.

General White, do you have a prepared statement?

General WHITE. I do not.

Senator JOHNSON. I call attention to members of the committee that General White, the Air Force Chief of Staff, is appearing with the Secretary in line with the very excellent suggestions made yesterday by Senator Stennis that where witnesses could, they appear together.

Secretary Douglas has delivered a very informative statement to the committee, and counsel will now examine.

Mr. WEISL. Mr. Secretary, you have given the committee a very well considered and hopeful program of what you now have and what you expect to have in the future.

Does this mean that you are satisfied with conditions as they are?

Secretary DOUGLAS. No, sir. I think the Air Force is never satisfied.

Mr. WEISL. I am not asking whether the Air Force is ever satisfied or not. I want to know whether you are specifically satisfied with conditions as they are now with respect to the condition of your force in being and the programs for the future.

AREAS FOR IMPROVEMENT

Secretary DOUGLAS. I am not satisfied with the situation as it exists today. I think it is of utmost importance that we take immediate steps for the dispersal of SAC units beyond the present rate planned, for increasing the alert capability of SAC units, and also in particular, as I have indicated, we must follow through with immediate steps to create a substantial ICBM and IRBM capability at an earlier date than previously planned.

Mr. WEISL. Mr. Secretary, we have had evidence under oath here of many deficiencies in the present system of getting things done, getting things organized and planning for future weapons.

We have been told that it takes twice as long for the United States military services to get a weapon into operation as it does the Russians.

You would consider this a very serious defect if it is true, do you not, Mr. Secretary?

Secretary DOUGLAS. It would of course be a serious defect. I have spent, not in the immediate past but about a year ago a good deal of time on this whole problem of lead time from concept to an operational weapons system.

The problem is a difficult one. I think we learned a good deal at that time as to organizational and administrative changes within the Department that might be of some assistance to shorten the lead time.

This is necessarily one of our goals, but I would like to point out that the lead time from concept to an operational weapons system is a very difficult standard to use for any comparative purposes.

The most imaginative group who at the earliest time see the possibility and have a concept of a weapons system are necessarily looking into the future further and going beyond the state of the art further than the less imaginative who see an immediate need at a late date.

When one sees the immediate need at a late date within the state of the art, the lead time involved from seeing that need to the weapons system is naturally relatively short.

Mr. WEISL. Mr. Secretary, the fact remains that the Russians have an engine with a thrust sufficient to project a thousand pound satellite in orbit, is that not so?

Secretary DOUGLAS. Yes, sir.

Mr. WEISL. We have it now?

Secretary DOUGLAS. Yes, sir.

Mr. WEISL. Where is it?

Secretary DOUGLAS. In all three programs.

Mr. WEISL. I am not talking about programs. It has been testified that we have no engine with a thrust sufficient enough to cast a thousand pound satellite in orbit with a guidance that will keep it in orbit.

Secretary DOUGLAS. Let me put it this way to avoid any misunderstanding, Mr. Weisl.

The Atlas, as the committee knows, is in a testing period, and to date only two flights that were not fully successful have been made.

Mr. WEISL. Are you speaking of a cluster of engines or a single engine?

Secretary DOUGLAS. I am speaking of a single engine supplemented by a second stage.

Mr. WEISL. Mr. Secretary, you spoke about a warning system and how essential it is to have a warning system so that if intercontinental ballistic missiles should be projected against our country, we will have sufficient time to get SAC off the ground and to get other retaliatory forces in operation.

Do we have such a warning system at the present time?

Secretary DOUGLAS. No, sir; we do not have such a warning system.

Mr. WEISL. What are we doing about getting such a system?

Secretary DOUGLAS. We are moving with the utmost urgency to secure such a system and we already have a certain components of it.

Mr. WEISL. How long have we had notice that such a system is necessary to protect the United States?

Secretary DOUGLAS. I think that that is a question that perhaps General Putt will cover better in his testimony.

Mr. WEISL. But at the present time we have no such warning system?

Secretary DOUGLAS. We do not have such a system operating.

Mr. WEISL. And we are working on it?

Secretary DOUGLAS. Yes, sir.

Mr. WEISL. And we are working on some components?

Secretary DOUGLAS. We have some of the components.

Mr. WEISL. So that if a ballistic missile were projected today by the Russians, we would have no warning of it?

Secretary DOUGLAS. That is correct.

Mr. WEISL. Now we have had letters from suppliers of weapons, and as the chairman said, we cannot compliment these suppliers enough. They have put the facts right on the line and told us what was wrong in getting these weapons out.

First, they spoke of the lack of the use of overtime. They said that they could not get permission to work overtime on some of these weapons, and as a result of that, they were delayed in producing these weapons.

Do you agree with that conclusion?

Secretary DOUGLAS. I would like to be specific with regard to that question and relate my answer to the ICBM and IRBM system.

Mr. WEISL. Mr. Secretary, I am not criticizing anyone. I am merely trying to get the facts out. I am certainly not criticizing you or the Air Force.

Secretary DOUGLAS. I do not believe that a limitation on overtime has had any considerable effect on either the ICBM or the IRBM, perhaps, Mr. Weisl.

Mr. WEISL. Well, Mr. Secretary, Convair, Lockheed disagree with you.

Secretary DOUGLAS. I might say that I would be delighted to have an opportunity to talk that out with them, and I would like to explain a little bit further.

The only time there has been an overtime limitation was during a period of about 3 months from early August until early November. During the same period there was a review of these three programs, which I think satisfied us that we could never have overtime limitations on testing, and we did not have overtime limitations on testing.

Senator JOHNSON. You are familiar, I assume, with the Secretary of Defense's testimony before this committee.

Secretary DOUGLAS. I think I am, sir.

Senator JOHNSON. I would like to point out that, in my opinion, the most important statement he made was that after his comprehensive survey of the whole missile situation, the principal bottleneck he found was restriction on overtime, and that he had taken steps to eliminate it.

And if he found it, why have you not found it? And if he knows it, why do you not know it? And if he testified that is the principal bottleneck, why have you not heard that it has interfered with production?

Secretary DOUGLAS. I was referring to the effect on the programs to this time. The only overtime restrictions were during a period of 3 months. They never applied to the testing program.

Senator JOHNSON. Nobody is talking about testing.

Secretary DOUGLAS. Yes, sir. That is an essential part of the program.

Senator JOHNSON. The question was not limited to testing. I want to read this for your information, and see where you have been when the Secretary of Defense was up here talking to us. You have a great responsibility in connection with the missile program, and apparently you are either not familiar with his testimony or you are in disagreement with it. Here is what the counsel asked him:

Mr. WEISL. Can you, without breaching security, tell the committee what bottlenecks you found and what remedies you took to eliminate them?

Mr. McELROY. Well, the principal bottleneck we felt we found was a limitation on overtime in certain instances. Where that was discovered, we moved rather quickly in order to authorize overtime as the service—

I assume that means all of them, the one which you head—

indicated that any such freedom from restriction would help them in the speeding up of their programs.

Secretary DOUGLAS. Sir, I myself requested, as far as the Air Force was concerned, that overtime restrictions be eliminated.

Senator JOHNSON. Why? Why?

Secretary DOUGLAS. Because they could damage the program.

Senator JOHNSON. Why did you not say that you found it could damage the program, and that the restriction could damage it, and therefore you had asked for lifting it?

Secretary DOUGLAS. Sir, excuse me. I merely stated that I thought the restrictions during the period they were effective had not substantially damaged the program.

Senator JOHNSON. Then you do not agree with the Secretary that it is the principal bottleneck?

Secretary DOUGLAS. I thought it was very important that they be eliminated.

Senator JOHNSON. Go ahead, Counsel.

Mr. WEISL. Mr. Secretary, there have been other suggestions made to speed up and accelerate the missile program by these various suppliers of ballistic weapons, and I will go into those with your staff and with General White's staff when they appear.

What suggestions have you as to how the program can now be accelerated? For instance, would you go into a Manhattan-type project?

Secretary DOUGLAS. Mr. Weisl, I think that in the Air Force Ballistics Missile Division we have as a practical matter a very good peacetime version of the Manhattan project, and I say that for this reason:

It seems to me that two of the outstanding features of the Manhattan project were that they gave one man great responsibility, and he reported directly to the Secretary of War.

Also, the Manhattan project had a tremendous technical staff of civil servants drawn from education and industry throughout the country according to their talents.

In the case of our Ballistic Missile Division, which is responsible for the ICBM and IRBM programs, General Schriever has very great authority and control. He reports directly to me, and he reports also to the Director of Ballistic Missiles.

In peacetime, the gathering of such a staff of civilian technicians as was gathered in the Manhattan project is simply not practical. We met that problem by a contract with a firm which would provide systems engineering and technical advice throughout the project.

That firm has in it today as qualified and talented a group of scientists and engineers as could be put together in the country for the purpose.

Mr. WEISL. Are you referring to the Ramo-Wooldridge Corp.?

Secretary DOUGLAS. Yes, sir; I am.

Mr. WEISL. Did you read their letter of complaint?

Secretary DOUGLAS. This is a letter of Ramo?

Mr. WEISL. I mean of suggestions, of Ramo's. Let me read one paragraph, Mr. Secretary.

Secretary DOUGLAS. I saw the letter last night for the first time. I did not have an opportunity to read it.

Mr. WEISL. Let me read one paragraph. You understand, Mr. Secretary, we are not trying to criticize or blame you.

Secretary DOUGLAS. Right.

Mr. WEISL. We are just trying to get out the facts clearly and fairly so we can do something about it.

Here is a letter from Mr. Ramo, the man, the head of the organization upon which General Schriever relies to a considerable extent.

The chief factor in determining where we stand in missiles and satellites today is the late starting date, late compared with when these programs could have been started. This late start resulted from years of established practices to mull over, argue out, often in an atmosphere of interservice rivalry, analyze and committee to death, the starting of any major project. We have had this dilemma. Our pattern of operations has precluded us from committing to large projects early when the job appears too speculative as to its final results. Yet we have not permitted large basic research and development expenditures that in the end constitute the only means for uncovering evidence as to potential success of new concepts. It is a small exaggeration to state that the starting of our huge ICBM and IRBM programs resulted when they did rather than a year or two later only due to the accidental timely appearance in the right places of certain personalities of exceptional conviction, imagination, and courage.

Do you agree with that statement by the leading consulting scientific and engineering organization on these programs?

Secretary DOUGLAS. I think I agree with most of it, Mr. Counsel.

It is rather difficult to say when a perfect state for human judgment exists, to say when a program should start and reach a decision. We started some of these programs in 1946, the results were discouraging, and under conditions which existed these programs were substantially dropped. They were not revived for a considerable period of time.

The ballistic missile did not seem to have very great promise due to the weight and character of warhead that was available or might be available at that time.

When in 1953 the ballistic missiles evaluation committee looked at the whole problem and reached a conclusion that a breakthrough was in process and urged that the ballistic-missile program be given top military priority, this was done.

I have the greatest regard for the people who had the imagination at that time to set it up in the way that I described as our ballistic missile division is organized.

Mr. WEISL. Now, Mr. Secretary, you do have confidence in the organization that is the leading organization advising the Air Force?

Secretary DOUGLAS. Yes, sir.

Mr. WEISL. Let me read you further what they say:

However, with regard to all follow-on projects—

now, this letter is dated only a week ago—

However, with regard to all follow-on projects, including improved ballistic missiles and a variety of satellites and other space weapons systems, we will make progress at a faster rate only if (a) very major changes are made in the Defense Department organization to eliminate interservice rivalry handicaps; (b) separate funding is provided for these major programs; (c) new procurement and research and development policies are instituted that will permit large gambles; and (d) in the long run, relatively huge expenditures are committed compared with our present trivial ones for basic research—

and so forth.

Do you agree with that suggestion by Ramo-Wooldridge?

Secretary DOUGLAS. Well, I think that that is a little more extreme statement than I would make if asked to characterize the whole situation.

I spent part of yesterday with Mr. Ramo. I spent part of the day with the scientific committee which is advisory to the Air Force ballistic missile program, headed by Dr. Millikan.

This group was reviewing at our request the present status of the program, and also reviewing the various proposals and directions that our research and development and ballistic missile division sees as promising throughout the whole program.

The problem of how much to spend on research and development is a very difficult one. We are urging that more be spent. I am assured that we will be provided with funds on a larger basis than a year ago.

Mr. WEISL. Well, I hope your hopes are realized.

Mr. Secretary, you visited the Atlas plant yesterday?

Secretary DOUGLAS. No, I did not visit the Atlas plant. I visited the Douglas plant which is engaged in producing Thor.

Mr. WEISL. And you consider, however, the Atlas program as of vital importance to the security of this country, do you not?

Secretary DOUGLAS. I consider it deserves the top priority which it has.

Mr. WEISL. Did you read the testimony of Mr. Holaday in which he stated:

We are accelerating the Atlas program—
and I quote—

The amount of money going into it, I do not wish to disclose, but the program is being accelerated to make more units or wings available and squadrons at an early date.

Secretary DOUGLAS. Yes, that action is being taken on our recommendation.

Mr. WEISL. Has the action been taken?

Secretary DOUGLAS. It has.

Mr. WEISL. Has the company manufacturing the Atlas program heard about it?

Secretary DOUGLAS. I believe so, although I would judge that the letter from Convair which referred to the size of the operational capability plan had been written before this action was taken. That letter I did have an opportunity to read, sir.

Mr. WEISL. Has anybody sent a letter or a telephone communication or a wire to Convair to let them know they are supposed to accelerate this program?

Secretary DOUGLAS. I cannot answer personally of my own knowledge.

Mr. WEISL. Well, did anybody in the Air Force, to your knowledge, do that?

Secretary DOUGLAS. I say I cannot answer, to my own knowledge.

Mr. WEISL. You cannot answer.

ADDITIONAL FUNDS NEEDED FOR IRBM AND ICBM

Are additional funds needed to make the ICBM and IRBM programs as effective as possible, Mr. Secretary?

Secretary DOUGLAS. Yes, sir.

Mr. WEISL. Will you tell the committee to what extent they are needed, if you can without jeopardizing the national interest?

Secretary DOUGLAS. I think I can say this, Mr. Weisl: We have made recommendations with respect to accelerating the initial operational date of all three ballistic-missile programs, and also very substantially increasing the operational capability that was the plan up until the time that recent action has been taken.

We made these recommendations with respect to Atlas, Titan, and Thor. We will present—or I expect there will be presented to the Congress a request for very substantial additional funds for this purpose after the first of the year.

Mr. WEISL. Now, you have testified, Mr. Secretary, that the Atlas program was started in 1946; and, while it did not have top priority during that period, nevertheless it did continue with the same supplier from 1946 to the present time; is that correct?

Secretary DOUGLAS. That is correct, sir; although I believe there was a period during which there was no contract with that supplier.

Mr. WEISL. But the supplier, at his own expense —

Secretary DOUGLAS. That is my understanding.

Mr. WEISL. As we discovered, continued the program, despite the fact the Government didn't give them the funds or the contract?

Secretary DOUGLAS. This was in the late forties.

Mr. WEISL. In the late forties.

Now, that is a period of 11 years, and the program was accelerated later on in the fifties; is that correct?

Secretary DOUGLAS. That is correct.

Mr. WEISL. Has there ever been a successful test of the Atlas?

Secretary DOUGLAS. No, sir; there has not. I would like to qualify that. When we say "successful test," we must have some standard of new information secured from the test as being the measure of success.

We would not plan tests of new missiles in very large numbers if we expected the first tests to be successful in every respect; that is, to provide not only successful launching but successful flight through to burnout of the rocket and successful guidance.

The two flights resulted in the programs securing invaluable information toward a successful Atlas.

Mr. WEISL. However, there has never been a test made with a complete Atlas?

Secretary DOUGLAS. That is correct also, sir.

Mr. WEISL. Now the decision has been made by the Defense Department to manufacture or put into production both the Jupiter and the Thor, and the operation will be the responsibility of the Air Force; is that correct, Mr. Secretary?

Secretary DOUGLAS. Yes, sir.

Mr. WEISL. How does the Air Force plan to carry out this decision?

Secretary DOUGLAS. This, of course, raises questions of production, training and deployment.

The Air Force, as I indicated, plans to deploy Thor squadrons in the United Kingdom in December of 1958.

It also plans to deploy overseas a Jupiter Squadron at substantially the same time.

As for training, the Air Force will train its Thor squadron personnel at Camp Cook, Calif.

There are already Air Force personnel in training to be the instructors of Thor programs. We expect to send Air Force personnel to the Redstone Arsenal to be trained under Army auspices with respect to the operation of the Jupiter.

MILITARY SIGNIFICANCE OF THE SATELLITES

Mr. WEISL. Does the Air Force believe in the military significance of the satellite?

Secretary DOUGLAS. The Air Force does believe in the military significance of the satellite.

Mr. WEISL. Does the Air Force attach great importance to the —

Secretary DOUGLAS. It does.

Mr. WEISL. Do you agree with the testimony of Dr. von Braun and General Medaris and General Gavin as to the importance of the military significance of the satellite?

Secretary DOUGLAS. It is my impression that they testified that the satellite was the most important vehicle and development that we could devote our efforts to at the present time. I would like to say that I think that the ballistic missile is still our immediate problem, but I think that the satellite is of such high priority that we need not try to distinguish between the two.

Mr. WEISL. Thank you, Mr. Secretary.

Mr. Chairman, those are all the questions that I have.

Are there any suggestions that you would like to make that have not been covered by my questions, Mr. Secretary?

Secretary DOUGLAS. Well, I think I pretty well gave my views in my statement as to the importance of our research and development program, as to the support that we need for these programs, and as to actions both with respect to missiles and manned bombers which I believe will develop in our programs at this time.

Mr. WEISL. Mr. Secretary, I wish you would check on your testimony as to whether we have an engine capable of launching a thousand pound satellite, and also whether you have an engine and guidance sufficient to cast a thousand pound satellite in orbit.

Will you do that, please?

(Subsequently, the Department of the Air Force filed a memorandum entitled "high thrust engine" which is included in the classified records of the subcommittee.)

Secretary DOUGLAS. I will be glad to. I added to the engine a second stage which is available.

Mr. WEISL. You mean a cluster of engines?

Secretary DOUGLAS. No, a single second stage engine.

Mr. WEISL. Thank you, Mr. Secretary. That is all the questions I have, Mr. Chairman.

Senator JOHNSON. Thank you, Mr. Counsel.

Mr. Secretary, do you think that we are even with the Soviet Union in missile development?

Secretary DOUGLAS. No, sir, my judgment is that they are somewhat ahead of us.

Senator JOHNSON. What do you think we ought to do, 1, 2, 3, 4, to speed up our missile development?

Secretary DOUGLAS. I think we have recommended the actions that are currently most important, and I believe that with respect to most of them, you will find all those recommendations reflected in the program we will present immediately after the first of the year, sir.

Senator JOHNSON. All right, now, sir.

Will you tell the committee in language I can understand? I don't think your answer has been very responsive to my question.

Tell me what you, as the Secretary of the United States Air Force, will do to speed up our missile program, as briefly as you can.

Secretary DOUGLAS. I would, as we are now doing, review our research.

Senator JOHNSON. This is 1, I assume.

Secretary DOUGLAS. This is 1.

Senator JOHNSON. All right, 1.

Let's continue.

Secretary DOUGLAS. I would use, as we are using, the scientific talent of Dr. Millikan's committee which I talked with yesterday, to fully check on the present status of our program and make recommendations and suggestions if they have any.

I would also, and we have done this, review our research and development touching on these programs and on the missiles of tomorrow as well as the missiles of today.

Senator JOHNSON. Now, summarizing that No. 1, you have lost me.

Secretary DOUGLAS. This is research and development.

Senator JOHNSON. All right; research and development.

Secretary DOUGLAS. All right, more effort.

Senator JOHNSON. As to where you were yesterday, I am not interested. Tell me what you would do first in research and development.

Just put it in simple words that I can understand.

Secretary DOUGLAS. I would enlarge certain of our programs which we are doing.

Senator JOHNSON. You would enlarge certain research programs period, and you are now in the process of doing that?

Secretary DOUGLAS. Yes, sir.

Senator JOHNSON. That is No. 1?

Secretary DOUGLAS. Yes, sir.

Senator JOHNSON. All right, No. 2?

Secretary DOUGLAS. This is with respect to Russian missile capability and the missile program only.

Senator JOHNSON. That is right. I want to know what you would do 1, 2, 3, 4, to speed up the development of our missile program.

Secretary DOUGLAS. All right.

Senator JOHNSON. You gave me 1, you can speed up research.

You are going to enlarge it and you are already doing that.

Now No. 2?

Secretary DOUGLAS. To me the most important single action to be taken is to accelerate the Atlas program, and I would like also to accelerate the Titan program.

Senator JOHNSON. That is what you are going to accelerate?

Secretary DOUGLAS. That is right.

Senator JOHNSON. I want you to tell me what will you do to accelerate it.

You have told me you are going to increase the research.

Now No. 2, what would you do?

Secretary DOUGLAS. We adopt a program, the operation capability that we think is required in these programs at the dates that are feasible and make every effort to reach those operational capabilities.

This is Titan as well as in Atlas.

Senator JOHNSON. That is No. 2, I guess, whatever that is.

Secretary DOUGLAS. That is right.

Senator JOHNSON. You have lost me on No. 2. What is the second recommendation? The first is research. Now what is No. 2?

Secretary DOUGLAS. The second recommendation is to accelerate and increase the planned operational capabilities of both the Atlas and the Titan missiles.

Senator JOHNSON. How?

How do you do that?

Secretary DOUGLAS. We do that by the spending of more money in 1958 and in 1959 on production for the equipment of these squadrons to bring them in sooner and in larger numbers.

Senator JOHNSON. Now I think you are going to hit some pay dirt if you just keep rolling around here.

What you are saying is that you are going to step up some production schedules?

Secretary DOUGLAS. That is right.

Senator JOHNSON. Now let's say that. That is No. 2.

You are going to step up some production schedules and you are going to step it up by asking for more money and if you get it you are on your way; is that correct?

Secretary DOUGLAS. That is right.

Senator JOHNSON. Have you asked for the money?

Secretary DOUGLAS. Yes, sir.

Senator JOHNSON. Have they told you they are going to give it to you administratively?

Secretary DOUGLAS. As to a very large part of it.

Senator JOHNSON. You have cleared it with the Secretary of Defense?

Secretary DOUGLAS. Yes, sir.

Senator JOHNSON. And are you over the hurdle at the Budget Bureau?

Secretary DOUGLAS. No, sir.

Senator JOHNSON. You are still there?

Secretary DOUGLAS. We still have to present to this Congress our recommendation.

Senator JOHNSON. I understand about Congress. You let me worry about Congress. You follow my question. Don't tell me how you have to come before Congress. I know that. You have cleared it with the Secretary of Defense and he is going to honor and support your request for more money to step up production schedules on missiles for 1958 and 1959?

Secretary DOUGLAS. As to 2 of the 3 programs.

Senator JOHNSON. All right. Now is he going to give you, in your opinion, adequate funds?

Secretary DOUGLAS. I think so.

Senator JOHNSON. Now the Budget has not told you what they are going to do?

Secretary DOUGLAS. No, sir.

Senator JOHNSON. And of course the Congress has not? Now in your opinion is the Thor superior to the Jupiter?

Secretary DOUGLAS. I don't think I am qualified to answer that question.

Senator JOHNSON. You may not be qualified but——

Secretary DOUGLAS. I have consulted——

Senator JOHNSON. Give me an unqualified opinion.

Secretary DOUGLAS. No; I think both missiles have reached a stage where both are reasonably certain to be successful.

Senator JOHNSON. And you have no judgment about which may be the better?

Secretary DOUGLAS. No. I am sure we can get the Thor in quantity sooner than we can get the Jupiter.

Senator JOHNSON. I did not hear that.

Secretary DOUGLAS. We can get the Thor in quantity sooner than we can get the Jupiter.

Senator JOHNSON. I am not asking you about the speed.

I am asking you which in your opinion is the superior of the two weapons.

Secretary DOUGLAS. I have to say that I think they are both good missiles.

Senator JOHNSON. And you have no opinion about the superiority of one over the other?

Secretary DOUGLAS. Not at this point in their testing.

Senator JOHNSON. And there is a substantial difference in the two?

Secretary DOUGLAS. There are differences in the guidance systems, differences in the theory on which the nose cone is produced.

I am not qualified to express an opinion as to whether the A-C spark plug guidance system is better than the Sperry guidance system or whether the nose cones on the two missiles offer any clear choice.

Senator JOHNSON. And in your opinion—

Secretary DOUGLAS. They are both satisfactory, I think, for development.

Senator JOHNSON. In your opinion there is a substantial difference in the two missiles?

Secretary DOUGLAS. For operational purposes I would not think there were substantial differences.

Senator JOHNSON. Your testimony is that you do not believe there is substantial differences in the two missiles?

Secretary DOUGLAS. That is correct.

Senator JOHNSON. Now you made a trip yesterday that you told us about. Did you find anything on your trip yesterday that indicated that the production of the Thor could be handled on an accelerated basis so as to permit an earlier operational date?

Secretary DOUGLAS. I know it can be handled to meet almost any requirements that may be established for Thor.

Thor can move into substantial monthly production at a very early date, and has been directed to do so.

Senator JOHNSON. So in your opinion you have already issued the order?

Secretary DOUGLAS. Yes, sir.

Senator JOHNSON. And you think as far as the Executive is concerned, they are going to supply the funds to get the Thor operational as soon as possible?

Secretary DOUGLAS. That is correct.

Senator JOHNSON. As early as possible?

Secretary DOUGLAS. That is correct.

Senator JOHNSON. In your opinion have you done everything that you could since October the 4th to speed our missile program so far as your service is concerned?

Secretary DOUGLAS. I hope that is the case, sir.

Senator JOHNSON. I know you hope that. Do you believe it?

Secretary DOUGLAS. I have taken a good many actions in that direction including recommendations with respect to all three missiles.

Senator JOHNSON. All right; now if you can, my time is limited here.

Secretary DOUGLAS. Right.

Senator JOHNSON. And you just listen to me. You take a good many actions. List for me the five most important actions you have taken since October 4, to speed this missile development.

Secretary DOUGLAS. Including in the 1959 budget submission——

Senator JOHNSON. Give me five of the most important actions you have taken. You said a good many. I will just limit it to five because my time is limited and Senator Bridges is waiting for me.

Secretary DOUGLAS. Including in the 1959 budget submission a recommendation for more funds for Thor, the Atlas and Titan.

Senator JOHNSON. More funds for three. Go ahead.

DOUGLAS' RECOMMENDATIONS

Secretary DOUGLAS. Also recommending that a request be made in a 1958 supplemental budget for this purpose: Reviewing plans for deployment and base construction of these missiles and making recommendations with respect to additional base facilities for the ICBM's.

Senator JOHNSON. So No. 1 is more funds. No. 2 is more base facilities?

Secretary DOUGLAS. Right.

Senator JOHNSON. Now No. 3.

Secretary DOUGLAS. No. 3 is ascertaining that all steps are being taken to provide instructors for military personnel to operate these missiles.

Senator JOHNSON. All right; that is kind of a study thing.

What did you do to get more instructors, anything? Did you get any?

Secretary DOUGLAS. Yes. Actually what happens is that our personnel selects noncommissioned officers and officers whose technical skills give them a reasonable qualification to take the instruction, and these men at the present time are at the Douglas plant, working on the missile with the contractor, and some of them are also working on the development of facilities at Camp Cook, which is the first training facility for the missile.

Senator JOHNSON. So would you say you have increased and speeded up the obtaining of additional trained personnel?

Is that what you are saying?

Secretary DOUGLAS. Yes. I am not saying that I take personal credit for this but I have ascertained that these things are being done.

Senator JOHNSON. You said you made a good many decisions and took a good many actions to speed it. Now that is three of them. You have some increased trained personnel?

Secretary DOUGLAS. Right.

Senator JOHNSON. You have recommended additional money.

Now go ahead and give me the fourth one.

Secretary DOUGLAS. Then after a further study of the IRBM situation, we decided that it was practical to make a second recommendation calling for an earlier operational date on the IRBM, on the Thor, and bringing in the earlier squadrons substantially earlier than had previously been planned, and that was a written action and a written recommendation.

Senator JOHNSON. Would you incorporate in the record at this point any additional decisions and recommendations you have taken that in your opinion would speed the missile program?

Secretary DOUGLAS. I would be happy to, sir.

(An Air Force memorandum (acceleration of the missile program) filed subsequently with the subcommittee is as follows:)

ACCELERATION OF THE MISSILE PROGRAM

Secretary Douglas' testimony covered all of the recommendations made by the Air Force to the Secretary of Defense. Secretary Douglas' recommendation for more funds involved a higher production rate as well as earlier operational dates for both IRBM's and ICBM's.

Senator JOHNSON. I have just 1 minute left and I want to ask your opinion on some recommendations made by scientists and manufacturers which we have submitted to the Army and the Navy. I think these have been pretty generally embraced with perhaps modifications as to the civilian commission. There is general agreement among some hundred people that we have interviewed—scientists, manufacturers including the people high in the service that have testified before this committee—that the following things could and perhaps should be done in connection with our missile program.

One, eliminate overtime restrictions.

Two, reduce lead time by making early and firm decisions.

Three, allow contractors more leeway to make technical decisions.

Do you have any comment on those three?

Secretary DOUGLAS. Well, I think in general I am in agreement with them.

I would make two comments: I think that in some production programs it is economic and not damaging to the program to have some overall overtime restrictions.

What was the third one, Mr. Chairman?

Senator JOHNSON. More leeway to make technical decisions by the contractors.

Secretary DOUGLAS. I think that is generally desirable, but that is a very difficult problem of judgment that has to be worked out between the customer and the contractor day in and day out.

Senator JOHNSON. We understand that.

Most of these are difficult but all the contractors, the manufacturers, and the scientists and the service people we have talked to have recommended them. There is a central theme that runs all the way through their testimony. These are the things they have suggested and I want to get your reaction.

Research and development programs should be on a 3- to 5-year basis instead of an annual basis so there can be adequate planning—that is we should not turn the hydrant on and off?

Secretary DOUGLAS. I could not agree to that as a general statement.

Generally speaking, our research and development programs involve renewal of 1-year contracts.

I think in a good many instances that is a mistake and we are at present engaged in correcting that in instances where we think it is appropriate for a longer term contract for research work.

Senator JOHNSON. What term?

Secretary DOUGLAS. Most research is effort.

Senator JOHNSON. What term, what term, longer term?

Secretary DOUGLAS. Two to three years.

Senator JOHNSON. Two to three?

Secretary DOUGLAS. Yes, sir.

Senator JOHNSON. So you have modified that from 1 to 2 to 3 instead of 3 to 5?

Secretary DOUGLAS. Yes, and you would not do it with all your contracts by any means, Mr. Chairman.

Senator JOHNSON. I understand. There is a need for permanent, competent adequate staff in the Department of Defense to provide leadership in basic and applied research.

Secretary DOUGLAS. I think that the Department of Defense research and engineering staff is a competent staff.

Senator JOHNSON. Fine. You think you have got all you need and you are satisfied with the adequacy and the competency of it, and when history reviews your testimony they can quote you as saying that everything is "hunky-dory" in your opinion now?

Secretary DOUGLAS. No, I would like to make it better, but in the ballistic missile program, as Secretary of the Air Force I have not been conscious of any deficiencies in the Secretary of Defense Office of Research and Development.

That office has hardly been active in this so far as my experience is concerned.

Senator JOHNSON. I am not asking about a specific office. I am asking you if you are satisfied that there is sufficiently adequate, sufficiently competent, sufficiently permanent staff in the Department of Defense to provide a sufficient leadership in basic and applied research, and I assume your answer, sir, is "Yes."

Secretary DOUGLAS. Yes, I think I will say "Yes."

Senator JOHNSON. And the United States urgently needs to bring its missiles satellite basic program under an independent commission.

What would be your comment on that?

Secretary DOUGLAS. I disagree completely on that.

Senator JOHNSON. Thank you very much.

Senator BRIDGES?

Senator BRIDGES. Mr. Secretary, I would like to ask you or General White when the Thor program was first started.

Secretary DOUGLAS. When what, sir?

Senator BRIDGES. When the Thor program was first started.

Secretary DOUGLAS. I believe in December of 1955.

Senator BRIDGES. Was that the date of the general beginning of our intermediate range ballistic missile program?

Secretary DOUGLAS. That is correct, sir.

Of course it called very largely on the ICBM program.

Senator BRIDGES. And what would you say addressing either you or General White as the Chief of Staff of the Air Force, is the general readiness of the Thor today?

Secretary DOUGLAS. I think the best answer to that, Senator, is the fact that we are committed to deploying a fully operational Thor squadron to the United Kingdom a year from this month.

Senator BRIDGES. And do you think you can meet that schedule?

Secretary DOUGLAS. Yes, sir.

Senator BRIDGES. You give that answer without any hesitation?

Secretary DOUGLAS. Yes, sir.

Senator BRIDGES. There was a recent decision to produce both the Thor and the Jupiter.

The Air Force has responsibility for the Thor and the Army is developing the Jupiter. I assume that the decision was made so we wouldn't gamble completely on one. What will it cost, approximately, to put both of these missiles into production?

Secretary DOUGLAS. Senator, do you mean as compared with producing only one?

Senator BRIDGES. Yes.

Secretary DOUGLAS. I am not able to give an exact figure, although I have spent quite a little time looking at the problem, as it is a problem of real concern to me.

I expect in the near future to have sufficient facts to make our whole production program recommendation clear in the light of this problem.

I think that it is reasonable to say that if we could proceed and were justified fully in proceeding with Thor at the present time without Jupiter, the present operational program could be accomplished for perhaps as much as \$200 million, perhaps more, less than in going ahead to equip the presently planned units with both missiles.

As the program increases in size if it does, the difference will become relatively smaller, at least in relation to the whole program.

Senator BRIDGES. Is it your judgment that the reason the decision to produce both missiles was made to provide insurance against the possible failure of one missile?

Secretary DOUGLAS. Yes, sir.

Senator BRIDGES. And not gamble particularly on one missile?

Secretary DOUGLAS. I think there were two features in deciding on the direction which we received.

One was, as you suggest, insurance against any unforeseen delays and failures in either missile system, and also to some extent the problem of equipping early, in the next fiscal year, squadrons, more than one squadron, by having both missiles again to insure such deployment at a relatively early date.

Senator BRIDGES. Mr. Secretary, both General Gavin and Dr. von Braun testified that our highest national priority should be devoted to the space programs rather than to the ballistic-missile programs.

I understand from your testimony that you differ a little with that, as I think I do. You would put them on a more or less equal priority. Our fundamental goal for the present is the development of missiles. However, would you give equal priority to the space program or would you place the space program slightly below the missiles in order of priority?

Secretary DOUGLAS. I think as a practical matter, with respect to the production, one could give equal priority to satellite development without hurting either program or, I would like to say this: I would like to leave the priority with the ballistic-missile program to the extent that the two might conflict. I don't think that from here on, they would need to.

Senator BRIDGES. Senator Saltonstall wanted you to repeat that last statement, if you will.

Secretary DOUGLAS. I said that I would like to see them both given the highest priority; and then I modified that by saying: to the extent that they do not interfere with each other, in which case I would give the overriding priority to the production of the ballistic missiles.

Senator BRIDGES. With that I agree.

I have no more questions.

Senator STENNIS (presiding). Senator Kefauver?

Senator KEFAUVER. Thank you, Mr. Chairman.

Mr. Secretary, I appreciated the frank manner in which you have attempted to answer our questions with respect to your program, and also your confidence in the Air Force in this field.

In your statement you have not dealt in detail with the necessity for some kind of program to try to keep your technicians and specialists over a longer period of time.

The matter of the Cordiner report is being dealt with by a separate subcommittee headed up by Senator Stennis, but briefly, is that a need or a problem in the Air Force?

KEEPING TECHNICAL PERSONNEL IS URGENT PROBLEM

Secretary DOUGLAS. Sir, I think a solution to the problem of keeping our trained technical personnel, both officers and airmen, deserves the same kind of priority that we are properly giving to the ballistic-missile programs.

Senator KEFAUVER. You have——

Secretary DOUGLAS. This is our No. 1 operating problem.

Senator KEFAUVER. You would have a more successful operation and get more done if that problem could be solved?

Secretary DOUGLAS. And more economically.

Senator KEFAUVER. You think it would be more economical, also?

Secretary DOUGLAS. Yes, sir.

Senator KEFAUVER. And you have given the matter a great deal of study, I take it.

Secretary DOUGLAS. I think I have given it considerable study, sir.

Senator KEFAUVER. You probably would not want to discuss this in open session, but the information you give about the Atlas down at Fort Canaveral——

Secretary DOUGLAS. I did not get the last word.

Senator KEFAUVER. About the firing of the Atlas at Cape Canaveral——

Mr. WEISL. In Florida, at the testing ground.

Secretary DOUGLAS. Well, I did not get the significance of the question. Did I want to say anything about firing the Atlas at Cape Canaveral? We have fired 2; we expect to fire 1 very shortly.

Senator KEFAUVER. That is all, Mr. Chairman, thank you.

Senator STENNIS. Senator Saltonstall?

Senator SALTONSTALL. Thank you, Mr. Chairman.

Just two question, as far as I can see, Mr. Douglas.

All your testimony has been on missiles. Your statement spoke about airplanes. Now, the emphasis on missiles today is not going to make the Air Force forget the importance of continuing to develop and put into production or into operational stages the best and newest types of airplanes; is it?

Secretary DOUGLAS. No, sir. We are pushing forward with modernization of the Air Force at the same time that we are trying to create a missile force, and it is essential that we do this to maintain our ready force in being which we must always have.

Senator SALTONSTALL. Where does the development, the research and development, of the airplane come on priorities as compared with the missiles?

Secretary DOUGLAS. Well, a great deal of our research work is still devoted to manned aircraft, and a program of modernization. This is particularly so with respect to materials which will permit us to build aircraft that will travel at higher speeds, particularly so in the field of propulsion, where we need, in the future, types of powerplants that will take us out of the air-breathing atmosphere, particularly so in electronics, both for control systems and for the operation of the aircraft.

Senator SALTONSTALL. So far as you are concerned as Secretary of the Air Force, you believe that our present retaliatory power and defensive strength rests in the airplane for some time to come; do you not?

Secretary DOUGLAS. Yes, sir; I do believe that.

Senator SALTONSTALL. Let me ask you just one other question.

We have had a lot of testimony in this committee about the authority given the Director of Guided Missiles by the Secretary of Defense for the research and development of missiles and all that goes with them.

Do you think that the present authority given to Mr. Holaday is sufficient to enable that program to go forward, enable him to direct that program forcefully and get action from it and make decisions quickly?

Secretary DOUGLAS. Why, I think that he has been given the full power of the Secretary of Defense in the missile field.

Now, to the extent that you were speaking of the proposed formation of an advanced research projects agency—

Senator SALTONSTALL. I did not mention that.

Secretary DOUGLAS. I am sorry.

This is also an area where it has been stated that there will be a central management set up under the Secretary of Defense.

Senator SALTONSTALL. You mentioned that. Does that mean—do I infer from that—that there may be a conflict in authority there, and conflict in priorities, so that we will not get out of this problem that we now face of having conflicting decisions and lack of action?

Secretary DOUGLAS. No; I am not suggesting that. Such problems as arise, I think they could be solved.

Senator SALTONSTALL. In other words, you would be content with the authority given Mr. Holaday on the missile program and the setting up of a separate agency on the space program?

Secretary DOUGLAS. Well, I think that the intentions on the space program are not yet sufficiently clear to permit me to express an opinion, but I have no undue concern over the proposal.

Senator SALTONSTALL. So you do believe that the present authority given by the Secretary of Defense to his assistant on missiles is sufficient?

Secretary DOUGLAS. Yes, sir.

Senator SALTONSTALL. If it is carried forward.

Secretary DOUGLAS. Yes, sir.

Senator SALTONSTALL. Thank you, Mr. Chairman.

Senator STENNIS. Secretary Douglas, I notice here at the middle of page 4 in the copy of the statement that you have, near the middle, you refer to the X-15 and say that the X-15 is a step toward a manned satellite

That is an interesting statement, and I just use it, though, as a vehicle for this question:

Now, it is claimed by some or suggested by some, I do not say this myself, that the Air Force is too absorbed with the idea of manned weapons and manned satellites to really be at the front of the forward-thinking with reference to the missile as a weapon.

I bring that up to give you—

Secretary DOUGLAS. That is a very—

Senator STENNIS. Let me make that clear, please.

I bring that up not as an accusation and not as my opinion, but to give you a chance, as one who is qualified on the subject, and to speak for the Air Force, too, to make comment and observations on that thought.

Will you speak to that?

Secretary DOUGLAS. Senator, I think I cannot but say that the first part of my prepared statement was devoted almost entirely to what I referred to as a question of attitude, trying to give assurance that Air Force personnel is adaptable, that it is aggressive in trying to move forward in new weapons systems, and that it is not bound to its experience with manned weapons systems.

I think the X-15 that I referred to is one of the radical and interesting projects—

Senator STENNIS. You think what, now? I did not catch it.

Secretary DOUGLAS. The X-15—

Senator STENNIS. Yes.

Secretary DOUGLAS (continuing). Is one of the interesting and radical development projects. It does include a man. It has a good many characteristics of the missile, and is able to reach altitudes of something like a hundred miles. It has almost all of the reentry problems of the ballistic missile and ultimate problems of returning it, a satellite, to the earth after it has been on orbit.

It really requires all the characteristics that one would find in a manned satellite to take care of the man. It does not require the propulsive force.

Senator STENNIS. Well, I think your statement here on page 4 is constructive and forward-looking, and you have the sentence there:

The one merges into the other, and we must learn to use both.

I believe you have put that better than anyone else I have seen that has tried to touch on the subject, and the Air Force is certainly qualified to touch on it.

Secretary DOUGLAS. I think one thing it is important to say is that the business of exploring space, is, for purposes of human experience, much like exploring the upper atmosphere. It is not just a question of having a propulsion system, but it raises all the questions of physiology, of behavior, of taking care of the individual.

Now, we have been doing this in high altitude aircraft for a good many years, and each year we are improving our tools and our knowledge rather amply.

Senator STENNIS. I think on that subject, and I was not making any accusation, because I do not know, against the Air Force, but I do think you are somewhat on the spot on that general thought, and I am sure you realize that and will seek to refute it and carry on both programs.

Secretary DOUGLAS. I think very likely General White would like to make some observations on that when he has an opportunity to.

Senator STENNIS. I don't want to defer anyone else from having a chance to question the Secretary, but if at this point General White, you want to make a brief statement into the record you can touch on it more fully later.

AIR FORCE LONG HAS HAD INTEREST IN MISSILES

General WHITE. In the first place, the Air Force has been interested in missiles from the very beginning.

In World War II we started out by using unmanned aircraft as air-breathing missiles. From there we moved into such air-breathing missiles as the Snark, the Matador, and from there into the ballistic missiles.

I might say that the whole intercontinental-ballistic missile program so far as I know is an Air Force project because it was started with the Atlas.

The Thor and the Jupiter were both fallouts from the Atlas program. The engines that are used in all of these systems are Air Force developed engines.

Now at the same time that we are developing these things we must keep the flying Air Force, the manned Air Force, ready to go and protect this country.

We have the double burden of keeping the force in being ready and modern and at the same time developing not only missiles, but, I hope, the coming on of satellite vehicles.

Senator STENNIS. I certainly want to agree with you for emphasis that one of your primary burdens and with the very highest priority is keeping your present weapons in being.

General WHITE. We have to——

Senator STENNIS. Right to the utmost; until the ultimate.

General WHITE. We have to do all three of these things on a first priority project in my opinion.

Senator STENNIS. We look to you, the Air Force to do just that and tell us what is necessary from our viewpoint here.

I only have about 2 or 3 minutes left, I think.

May I refer back now to the Secretary one more question.

Secretary Douglas, you are before our committees a great deal and I think you have a fine knowledge of our subject matter.

As a member of the Appropriations Committee and the Armed Services Committee year after year I hear the plea for funds, the request for funds for research and development for all three of the different services.

And I think last year the total bill in round numbers was something like \$5 billion.

I am familiar with the figures about what some of the other military programs cost, like the DEW line, for instance, and other warning systems, and other programs that run into the billions. I have a high regard for research and development and it would be the last thing I would want to curtail.

But let me ask you as an expert in the field, why is it that all three of the services have to have these separate research and development programs that divide the talent, divide the money, and divide up everything in so many different directions?

How can you justify that?

Secretary DOUGLAS. Well, I justify it by saying that I think that you will really only get the urgent effort from the user and the prospective user as a general proposition.

It is organized in different ways in different places, but I feel very strongly that you will never get as effective pursuit of research and development except when you have the user suggesting the ideas, and stating the needs.

I would like to say, Mr. Chairman—

Senator STENNIS. Pardon me, are you talking about basic research in your statement now?

Secretary DOUGLAS. I am talking about both basic research and applied research.

I think that one should say in comment on your statement of the \$5 billion, that the research and development accounts, as you know better than I do, for the three services total only about a billion eight, but that we do estimate that in the procurement accounts a great deal of development work is done and that is a hard figure to estimate.

Senator STENNIS. Well, the development part is the majority part of that figure of course, but back to the original heart of the question now, and you included basis research in your answer there, why is it necessary to have the services each with their separate setup rather than have the central agency or the central setup and the services, of course, highly advisory, and certainly right in the middle of the picture all the time.

I am asking for information.

Secretary DOUGLAS. I don't think, Mr. Chairman, I would find much objection to what one might call fundamental or basic research being centralized but as soon as you move over this ill-defined line into development research and the applications then I think it is of great importance that the user has the decision.

I would like to say with respect to the Air Force program at the present time we have a difficult time in drawing the line between basic and other research.

At this period we are probably spending about \$30 million on what we described in the account as basic research.

This includes work from, I believe, some 170 educational institutions and nonprofit organizations, and the contracts with these institutions number more than a thousand.

Senator STENNIS. Excuse me just a moment.

We will come back to that.

My 10 minutes are up and my time is up.

Senator Flanders?

Senator FLANDERS. Mr. Secretary, I would like to ask you as to what effect the appointment of Mr. Holaday is having on your scope of operations and on the size and character of your staff.

Does Mr. Holaday's appointment simplify your staff, reduce its numbers, or in any way lead toward simplification instead of complication?

Secretary DOUGLAS. Senator Flanders, I shall answer that question by saying it has not led to simplification.

It has not, I think, materially changed the Air Force situation as to Air Force staff.

Dealings of our research and development command, our Ballistic Missile Division with Mr. Holaday are very largely dealings that used to take place with the Assistant Secretary for Research and Development in the Secretary of Defense's Office.

So there has really been a shift in a relationship and contacts rather than creation of substantial new ones.

Senator FLANDERS. Does Mr. Holaday take the place of that Assistant Secretary or is he interposed below him?

Secretary DOUGLAS. No, sir. I would say he had powers distinctly superior to that Assistant Secretary, and the result of Mr. Holaday's appointment and activities is that we seldom deal, I would say probably have ceased to deal, with the Assistant Secretary for Research and Engineering as he is now designated on the ballistic-missile programs.

Senator FLANDERS. There is then no simplification, and so far as I can judge from what you have just said, no shortening of the chain of decision from the top down through to the place where decisions are put into active effect. You have simply taken or there has simply been a change in responsibility and authority from one man to another, the lessening of the mission of one and the insertion of another with a part of the mission of the old office?

Secretary DOUGLAS. I think I should add this: I think my first answer was not complete. It has tended to simplify our relationships somewhat in that although I referred on many matters to the Assistant Secretary for Research and Development, these programs give rise to contacts with many offices in the Office of Secretary of Defense.

Now, Mr. Holaday's appointment has tended to permit us to deal with him, and less with a number of offices. But the principal location of our contact with this kind of a program has been research and development.

Senator FLANDERS. The outlook for greater directness of control, simplification of organization, does not appear to me to be very brilliant and shining, as you have described it. I hope that it will work out as it has been hoped, but I do not really get from what you are saying, Mr. Secretary, any great improvement in the things which have been bothering people in those diagrams that are published from time to time showing the relations between committees, coordinating committees, and Secretaries and Assistant Secretaries and advisory committees.

They are all still there, are they not?

Secretary DOUGLAS. The Pentagon, Senator Flanders, is quite a complicated place.

Senator FLANDERS. It is a great place for going around in circles, or pentagons, rather.

ASSERTS LITTLE TIME HAS BEEN LOST IN MISSILE PROGRAMS

Secretary DOUGLAS. I think we have made pretty good progress in the programs we are talking about today, and I think that most of the industry testimony, which is from the other side of the table, will indicate to you that very little time has been lost in the ICBM and IRBM programs which are particularly Mr. Holaday's concern.

Senator FLANDERS. I just want to assure you that when I spoke facetiously about the Pentagon, it was purely facetious and not intended to be taken in a critical way.

Now, there is another question I wanted to ask you. When was the contract with Ramo-Wooldridge entered into? And again let me say, as everybody says to you, that this is asked-for information and is not intended to be a critical thrust of any sort.

Secretary DOUGLAS. I believe the contract was entered into in May of 1954. I will have the record corrected if that is a month off.

(The Department of Air Force subsequently advised that the contract was signed May 3, 1954.)

Senator FLANDERS. That was before the time of your——

Secretary DOUGLAS. No, sir; I was in the Air Force at that time.

Senator FLANDERS. You were?

Secretary DOUGLAS. I was Under Secretary.

Senator FLANDERS. Oh, yes; you were Secretary then?

Secretary DOUGLAS. I was Under Secretary, sir.

Senator FLANDERS. Under Secretary. So that you were familiar with it at that time?

Secretary DOUGLAS. I was generally familiar with it. I was not involved in day-to-day handling.

Senator FLANDERS. And it was not done under your direct personal authority?

Secretary DOUGLAS. No, sir; it was not.

Senator FLANDERS. I may say that on a visit which some members of this committee paid to the Pacific coast, we talked with Major General Schriever, and I may say that he impressed me very strongly. We were in the same building with the Ramo-Wooldridge organization, but had no opportunity in the densely packed agenda to which we were committed to see either of the heads of that organization or to observe its working.

I am not prejudiced against it. I do think we ought to know more about it, and I presume that will best be done by questioning General Schriever.

Secretary DOUGLAS. I think that General Schriever is your best witness on the subject, Senator.

Senator FLANDERS. The arrangement is an unusual one.

Secretary DOUGLAS. It is unusual. I tried to point out some of the important characteristics that it has, and I would put at the top of the list that it has provided a fund of great technical knowledge for advisory systems engineering and all other technical advice that is hard to get in peacetime any other way than by contract.

Senator FLANDERS. May I inquire as to whether there is involved in that the difficulty in the direct employment of highly competent men on a salary basis that the Government can pay?

Secretary DOUGLAS. I would say very definitely, sir.

Senator FLANDERS. So by this means you are able to get and hold men that you could not otherwise get and hold?

Secretary DOUGLAS. That is correct.

Senator FLANDERS. That is all, Mr. Chairman.

Senator JOHNSON. Thank you very much, Senator Flanders.

Senator SYMINGTON.

Senator SYMINGTON. Mr. Secretary, it is good to see you here.

Following your testimony, would you be good enough to give the committee the details of the overtime Directives 4105.48 and 4105.8; as to whether they are or are not now in force, and as to the dates of lifting, if any?

Secretary DOUGLAS. Are these the August directives with respect to overtime? I do not locate them by number. I am sorry, sir.

Senator SYMINGTON. One of them is and one of them is not. Would you give for the record when they applied, this with respect to counsel's interrogation on overtime?

Secretary DOUGLAS. Yes, sir.

Senator SYMINGTON. And when anything was lifted; and what is, as of today, still in force.

Secretary DOUGLAS. Yes, I shall.

(Department of Defense memorandum entitled "Details of overtime directives" follows:)

DETAILS OF OVERTIME DIRECTIVES

DOD Directive 4105.48 was first published June 19, 1957. It required an immediate and continuing sharp curtailment in the use of overtime in the performance of all kinds and types of DOD procurement contracts. However, the directive provided the service Secretaries authority to make exceptions where necessary. Under this provision, the Air Force exempted the ballistic missile programs from overtime restrictions. The June 19 directive superseded and replaced an OSD (S. and L.) memorandum dated May 16, 1957, "Curtailement of Overtime." The memo set forth the same general instructions and the directive, in essence, merely established these instructions on a more formalized basis. A October 1, 1957, revision of the directive set forth more stringent limitations on approval authority for contract overtime. This directive is still in effect. From the outset the instructions were applied to all programs other than the ballistic missile projects. However, the Secretary of Defense by separate memoranda August 13 and 16, 1957, imposed a 3-percent contractor overtime limitation on the IRBM and ICBM programs respectively. The imposed limitation granted a "reasonable" amount of overtime in excess of 3 percent for direct support of major test activities. By memorandum October 31, 1957, the OSD Director of Guided Missiles removed this restriction from the Jupiter program and granted the Army overtime as required to prosecute the program. On November 13 and November 22, 1957, the Air Force was granted similar authority with respect to the Thor and the Atlas/Titan programs respectively.

Senator SYMINGTON. I am sure you could not carry that in your head. Nobody could.

Now, in a recent talk, the question of the Snark and its performance was emphasized. Do you agree that it is an important weapon in our current defense?

Secretary DOUGLAS. Senator, the Snark has been a disappointment in the time that it took to bring it to the point of being an operational weapon. It came along, I should say, 4 years later than was anticipated during its development period. It is a useful weapon, in my opinion.

Senator SYMINGTON. It is the only long-range air breather that any service has, is that not correct?

Secretary DOUGLAS. That is correct.

Senator SYMINGTON. Then why did we recently cut its production 50 percent?

Secretary DOUGLAS. Because it has been overtaken by what we believe are reasonably certain prospects of the long-range ballistic missiles.

Senator SYMINGTON. But the long-range ballistic missile as of this morning has never fired successfully. With our possible enemy looking down our throat, how can you cut the only long-range operational missile 50 percent, when at the same time high people in Government are boasting about its performance, and you have never fired successfully its replacement?

Secretary DOUGLAS. Senator, from my point of view, I find that we are not able to do all the things we would like to do. I think you will find that the present program on Snark, although disappointing, represents the air staff military view of relative priorities between the Snark and other strategic delivery systems.

Senator SYMINGTON. Mr. Secretary, I would like the record to show that there has been a lot of satisfaction expressed in high quarters about the Snark; that its production has recently been cut 50 percent; that its production today is therefore fantastically small considering the buildup it received; that the justification you gave for that is, you have hopes for the future of the ICBM; and that the ICBM will not be operational for some years.

Now, you mentioned——

Secretary DOUGLAS. Senator, might I just ask one question about Snark?

Senator SYMINGTON. Yes.

Secretary DOUGLAS. Could I supply for the record what the facts are with respect to changes in the production program? It is my impression that we have failed to increase the production rather than cut actual production.

(Subsequently, the Department of Air Force filed a memorandum on Snark production which is included in the classified records of the subcommittee.)

Senator SYMINGTON. The only——

Secretary DOUGLAS. I am not certain about that.

Senator SYMINGTON. The statement I am referring to was given me by one of the officers of the company, that the production had been cut 50 percent.

Mr. Chairman, may I ask at this point that eminent counsel pursue this matter with the Secretary? He understands it better than I do. I was told this. It was a shock, and I would appreciate it if Mr. Weisl would pursue this. It is important.

Senator JOHNSON. That will be quite satisfactory. Mr. Weisl.

Mr. WEISL. Mr. Secretary, we have received a letter from the Northrop Co., which is manufacturing the Snark, and they state, sir—and I will leave off the exact number of missiles for security reasons.

Secretary DOUGLAS. Right.

Mr. WEISL. September 1957 is the date of this directive:

The total Snark SM-62 missile program was reduced * * * to a classified quantity of less than one-third both as to total quantity and rate.

Secretary DOUGLAS. This answers the question that I had in mind to be sure it was correctly stated in the record.

Mr. WEISL. And they go further and they say:

In reducing the fiscal year 1958 procurement by one-half.

Secretary DOUGLAS. I would like to say that this is an example of time overtaking a development. It was very promising. It has excellent characteristics. The characteristics are not very different in flight from the capabilities of the B-52, and it does not have the benefit of a manned and trained crew which give flexibility to the operations of the B-52. Had it come along sooner, it would undoubtedly have secured a larger place in our programing and in our inventories. Today we are forced to be highly selective, and this is an Air Force appraisal of relative capabilities and desirability of new weapons of strategic delivery.

Mr. WEISL. But, Mr. Secretary, as Senator Symington has constantly and validly pointed out, the ICBM missile is far away from operation. The Snark has the same range as the ICBM. We have been told it is difficult to detect on radar. We have been told it is close to being operational. And as the Senator points out, in view of what we have been told, why has the Air Force cut down the production of something that they might get quicker than the ICBM?

Secretary DOUGLAS. Mr. Weisl, it is not at all certain that we could get it much more quickly than the ICBM. We are very hopeful of having an operational ICBM not too far in the future.

Mr. WEISL. If that is so, Mr. Secretary, it is completely contrary to what the public have been told and what I have been told.

Secretary DOUGLAS. I think General White would like to comment on this question, Mr. Weisl, if you would like to have his comment.

Mr. WEISL. I am taking up the Senator's time on that.

Senator JOHNSON. No. Go ahead.

Senator SYMINGTON. I yielded to the counsel.

Senator JOHNSON. If General White wants to testify we are going to get an ICBM pretty soon, I would like to hear it.

General White, what have you got to say on that point?

General WHITE. I am sorry, Senator.

Senator JOHNSON. You heard what the Secretary said, did you not?

SNARK VERSUS MANNED BOMBER

General WHITE. He was commenting on the Snark. Do you want me to comment on that, sir?

I think the first thing to remember is that heretofore, and I presume in the future, funds are not unlimited. The Air Force, in determining its weapon systems, is forced, as are the other services, to make a mix of desirable weapons based on fund limitations this past year.

The Snark does not do anything really that the manned bomber cannot do except, one, it protects us from the loss of crews, which is desirable, but it cannot be as efficient as a manned bomber. It also has a very quick reaction time, which is useful, particularly if these weapons are sighted in on certain Soviet targets, you might say.

It also has one other advantage: that it can be programed at low level, for low-level attack.

It is simply a matter of judgment as to how many manned bomber units you want, how many of the air-breathing units, and what is the time at which we expect to get the ballistic missiles into the program. That is the reason for the Snark mixed with each of the other two types of weapon systems.

Senator JOHNSON. Do you agree with what Secretary Douglas said, that we are going to have an ICBM operational soon?

General WHITE. I hope we are. We are working on it very hard and I believe we are. It is the No. 1 priority in the Air Force today.

Senator JOHNSON. Do you think that we are much nearer today than we were when General LeMay came back from dropping that bomb on Hiroshima and was told we would not need any bombers 5 years from then?

General WHITE. We are very much nearer.

Senator JOHNSON. You are very much nearer. I am through, Counsel.

Mr. WEISL. When you say "soon," Mr. Secretary—

Secretary DOUGLAS. I said in the not-far-distant future, Mr. Weisl.

Mr. WEISL. Or in the not-far-distant future, would you say it is in a month?

Secretary DOUGLAS. No; it is not within a month. I would rather not get into that question, Mr. Weisl.

Mr. WEISL. Mr. Secretary, I wish then if you do not want to get into these questions—and I am not trying to be critical—you would not make a statement "not too far distant future" and then when we try to find out what the not too far distant future means, you say you would rather not say. It is very important that this committee know what you mean and that the public know what you mean.

Senator JOHNSON. Would you say a year?

Secretary DOUGLAS. My statement was—

Senator JOHNSON. Would you say a year, Mr. Secretary? Is that not too far distant, 1 year?

Secretary DOUGLAS. In my prepared statement, I said that we would have an operational unit of IRBM's in December of 1958.

Mr. WEISL. We are talking about ICBM's.

Secretary DOUGLAS. And I referred to the fact that we would not have the operational ICBM until after that date. I hope it will not be a year after that date.

Senator JOHNSON. That ties it down pretty well. You think then we are going to have an ICBM within 2 years from now?

Secretary DOUGLAS. Yes, sir.

Senator JOHNSON. That is what you are saying, is it not, if my mathematics are good?

Secretary DOUGLAS. I said "yes," sir.

Senator JOHNSON. While we are on that subject, Senator Symington, if you will pardon us again.

Mr. Secretary, I want to know what you mean by the last paragraph of page 3:

Although the ICBM's and IRBM's we are now testing represent a large step forward in strategic weaponry, we see ways to improve greatly the current types.

Does that mean you do not have very good missiles now, and you know it, and that you are going to improve greatly the current types? And, if so, what are the improvements you are talking about?

Senator DOUGLAS. The improvements will be in propulsion, they will be in guidance, they will be in simplifying the logistic problems which are particularly great when the whole missile is a liquid-fuel missile.

Senator JOHNSON. Thank you.

Thank you, Senator Symington. This will not come out of your time, but the chairman has certain duties he wants to perform, and appreciates you yielding to him.

Senator SYMINGTON. Thank you, Mr. Chairman.

Mr. Secretary, on November 7 last did you consider the Snark a promising weapon?

Secretary DOUGLAS. I don't connect the date with any particular significance to the Snark, sir.

Senator SYMINGTON. I did not ask you that. I asked you if, on November 7, you considered the Snark a promising weapon.

Senator DOUGLAS. I consider it a promising weapon within the characteristics described for it, Mr. Symington.

Senator SYMINGTON. The reason I asked that is that highest authority was very optimistic about the Snark in a telecast speech. I was just wondering if you agreed with that. Your testimony would imply that you do not.

Secretary DOUGLAS. The Snark is very promising. The Snark has performed over long distances with satisfactory guidance. It is subject to some of the limitations which have been recounted here.

Senator SYMINGTON. I would rather have a manned B-52, from the standpoint of the security of the country, than I would a Snark, but I am not the one who flushed the optimism about the Snark; and, inasmuch as it was flushed, I am wondering why its production was reduced 50 percent, at the same time high authority was giving it as one of the reasons we were not too worried about sputnik.

Let me proceed to another point. Are you telling this committee that, in your opinion, we will have an operational position of ICBM's to defend the United States, through retaliatory capacity, within 2 years?

Secretary DOUGLAS. Senator, I think this goes into a question of size of operational capability, and all types of problems of programing, that it is improper for me to discuss further.

Senator SYMINGTON. I know, but as counsel points out, if you bring up vague implications which we question, we have the right to ask particulars.

How many operational squadrons of ICBM's do you plan, as of today, by 1961? Let's be frank about this.

Secretary DOUGLAS. I am sorry, I think it is improper for me to answer that question, Senator Symington.

Senator SYMINGTON. Let me ask you another question: Are you getting as many operational squadrons of ICBM's by 1961 as asked for, allowed by the Pentagon or by the Department of Defense and/or the Bureau of the Budget?

Secretary DOUGLAS. I expect that the recommendation made by me and the Air Force with respect to ICBM capability will be approved.

Senator SYMINGTON. Have the recommendations of General Schriever for squadrons, by 1961, of ICBM's, been approved by you and the Department of Defense?

Secretary DOUGLAS. I am unable to answer that question. I have been dealing with a great many different programs, and all three missiles, and I am not quite clear what this calls for.

Senator SYMINGTON. Could I answer it for you, and you correct the record if I am wrong?

Secretary DOUGLAS. I would be happy to.

Senator SYMINGTON. The answer is "No." Let the record show at this time that the number of squadrons recommended by 1961 by General Schriever for the security of the United States, is very small in my opinion if the ICBM is as important as we are led to believe, and appalling to me therefore that that number was rejected.

(Subsequently the Department of the Air Force filed the following memorandum:)

RECOMMENDATION OF GENERAL SCHRIEVER

A review of the testimony on pages 1990 through 1991 indicates that it is desirable to explain the procedure by which Air Force plans and force objectives are established.

The Chief of Staff, USAF, is responsible for establishing force objectives. These objectives are reviewed by the JCS and reflected in joint war plans. Normally, programs and financial plans based upon these force objectives are thoroughly staffed by the air staff and reviewed by the Secretary of the Air Force before forwarding to the Office of the Secretary of Defense (OSD).

In the case of ballistic missiles, the procedure has been streamlined so that the Air Force Ballistic Missiles Committee, chaired by the Secretary of the Air Force, reviews and approves programs and financial plans submitted directly to it by General Schriever and forwards them to the OSD Ballistic Missiles Committee for final approval.

General Schriever is responsible for research and development, training and equipping of the initial operational capability (IOC) force of ICBM's. He is not responsible for specifying or recommending the size or timing of deployment of this force. When General Schriever recommends a program, he is recommending production rates, test schedules, facilities, phasing, etc., necessary to meet a force objective specified by higher authority. General Schriever shows how the objective can be attained and how much it will cost.

Since 1955 there have been a series of program reviews conducted on various size IOC's. From the testimony, it is not possible to determine which program Senator Symington was referring to. The latest submitted by the Air Force to OSD, in November 1957, was based upon a certain augmented force objective of Atlas and Titan squadrons through fiscal year 1963. OSD approved funds for an augmented Atlas, but not an augmented Titan program. In this connection, it should be kept in mind that both missiles are in the research and development phase. To some degree the decision to go for a specified number of squadrons can be deferred until the test article proves itself without seriously affecting the number of squadrons which can actually be available in fiscal year 1963.

Secretary DOUGLAS. Let me state this, Senator, I have to say one thing: I said "will be approved." The recommendation made by me and the Air Force to the Secretary of Defense with respect to operational capability has been approved.

Senator SYMINGTON. What you are really saying is, is it not, that either Mr. Holaday will change his mind, or his mind will be changed for him; is that not correct?

Secretary DOUGLAS. This is for Atlas, excuse me.

Senator SYMINGTON. What you are saying with respect to number of squadrons of Atlas operational in 1961 is that either Mr. Holaday will change his mind or his mind will be changed for him; is that correct?

Secretary DOUGLAS. No; I think Mr. Holaday has participated in approving the recommendation that we made.

Senator SYMINGTON. Mr. Secretary, I want to be careful about this. Are you saying that Mr. Holaday has approved the number of squadrons for 1961 recommended by General Schriever?

Secretary DOUGLAS. No, sir; I said recommended by me and the Air Force.

Senator SYMINGTON. In other words, you take responsibility for reducing the number of squadrons recommended by General Schriever yourself; is that correct?

Secretary DOUGLAS. I take the responsibility for the program. The program, when advanced and activated, can be again advanced and activated, when all circumstances make that appropriate.

Senator SYMINGTON. And did you make that reduction of recommendations on the basis of money? If not money, why?

Secretary DOUGLAS. Senator, I said I was not clear as to General Schriever's recommendation at this time, and you undertook to answer that question for me.

Senator SYMINGTON. Well, I know, but you are now undertaking to state it is not Mr. Holaday who made the reduction, it is yourself; and therefore you must know more about the program than your reticence would seem to have implied when I did answer the question for you.

Secretary DOUGLAS. The approval that I gave was an air staff recommendation.

Senator SYMINGTON. Right. And now, has that been cut by Mr. Holaday; or has it not?

Secretary DOUGLAS. It has not been cut by Mr. Holaday.

Senator SYMINGTON. In other words, the number of squadrons of ICBM's available by 1961, which is very small, as we both know is the figure recommended by the Air Force; is that correct?

Secretary DOUGLAS. That is correct, at this time, and I think it is very important to know that we have the problem of getting production underway and, as it is gotten underway, we can reexamine requirements and we can step up to a higher level.

Senator SYMINGTON. In other words, the reason that you refused to agree with General Schriever's recommendation is not a matter of monetary limitations; it is of your belief that you are utilizing production to the maximum extent; is that correct?

Secretary DOUGLAS. I think the only fair statement on that is that I approved the air staff recommendation that came to me in this instance.

Senator SYMINGTON. Well, then, General White, is the reason that you did not approve the recommendation of General Schriever one of financial limitations; or because you did not think the missiles could be produced?

General WHITE. My recommendation included a more rapid buildup of the Titan program, another ICBM. The 2 together would be a substantially greater program than the 1 that I understand is to be approved.

Senator SYMINGTON. And if you have the realization by 1961 of both the Titan program and the Atlas program, you have, in your opinion, enough of an ICBM potential from the standpoint of our national security?

General WHITE. Combined with the manned bomber force, I consider that to be so.

Senator SYMINGTON. Thank you, Mr. Chairman. I have no further questions.

Senator JOHNSON. Senator Bush?

Senator BUSH. Mr. Secretary, I congratulate you on your presentation this morning, and on the frank and forthright way in which you are answering these questions, appreciating fully the difficulties that go with your responsibilities.

On the question of the Cordiner report, are you familiar with that so-called Cordiner report?

Secretary DOUGLAS. Yes, sir.

FAVORS CORDINER REPORT "WHOLEHEARTEDLY"

Senator BUSH. Did you favor it?

Secretary DOUGLAS. I favor it wholeheartedly.

Senator BUSH. Do you find that there is a shortage of scientists available for important work which the Air Force is carrying on in connection with these developments of missiles?

Secretary DOUGLAS. I would say we do not find that there is a present shortage.

Senator BUSH. That would be the problem, I suppose, of your contractors and manufacturers, rather than your own problem; is that true?

Secretary DOUGLAS. It may be much more their problem.

Senator BUSH. But you do find difficulty in retaining in the service the men whom you have trained in a scientific way under the present scheme of things; is that right?

Secretary DOUGLAS. Yes. And, of course, one of the reasons is that we find ourselves, as soon as they are trained, in competition with industry for their services.

Senator BUSH. They leave you to go into industry?

Secretary DOUGLAS. The pressure is very strong in that direction.

Senator BUSH. And your belief is that the Cordiner report, if translated into law, the principles of it were put into law, it would do a lot to alleviate that loss of people from the Air Force and into industry; is that so?

Secretary DOUGLAS. I can think of nothing more important that can be done to assure the Air Force capability of performing its mission, and I feel certain that to a large extent increased costs with respect to higher compensation of technical personnel will be reflected not only in more efficient operation, but in very great realization.

Senator BUSH. I have no more questions, Mr. Chairman.

Senator JOHNSON. Thank you very much, Senator Bush.

Senator Barrett?

Senator BARRETT. Mr. Secretary, I am quite intrigued about the X-15 and the proposal to send that manned into outer space there; that is, is that programed at the present time?

Secretary DOUGLAS. Yes, sir.

Senator BARRETT. Does it require any additional funds?

Secretary DOUGLAS. No, sir. It requires the funds we are programming and hope will be requested in the 1959 budget and made available.

Senator BARRETT. I understand it might take as much as 30 months to get the X-15 developed to the point where, with the components of the Navaho, it could be used as a space ship, manned. But I thought it was not authorized at the present time.

Secretary DOUGLAS. Well, your question, Senator, really deals with a development of the project and not the project as it stands at the present time, because as it stands at the present time it does not require any equipment from a Navaho project.

Senator BARRETT. Well, as it stands at the present time, it is not a project that could be manned for outer space use, could it?

Secretary DOUGLAS. Well, it depends a little on what we call "outer space." The X-15 will fly, as programed, at altitudes in excess of a hundred miles.

Senator BARRETT. Would it be something on the order of the satellite?

Secretary DOUGLAS. Well, it has different characteristics. It has wings. It is not dissimilar to the early X-1 and X-2 aircraft, with which spectacular experimental speed and altitude accomplishments took place.

Senator BARRETT. I think the project is very desirable, and I hope we prosecute it as rapidly as possible, although I believe you are entirely correct that the emphasis should be placed on the ICBM's and IRBM's at the present time.

I would like to see them both developed at the same time.

I want to congratulate you, Mr. Secretary, on your splendid presentation here this morning.

Secretary DOUGLAS. Thank you, Senator.

Senator JOHNSON. Mr. Secretary, you said that 2 of the 3 requests for increased funds that you made were approved. Why was the third not approved?

Secretary DOUGLAS. Our request for acceleration and increase of the Titan program has simply not been acted upon and I take it that it is still under consideration.

Senator JOHNSON. But if one has been approved and the other not acted on, it is not fair to say it has been disapproved?

Secretary DOUGLAS. That is correct.

Senator JOHNSON. General White, I would like to ask a few questions of you for the record before you leave.

In your opinion will the delay in negotiating base rights with NATO allies impede the IRBM program?

General WHITE. Defeat it?

Senator JOHNSON. Impede it. Will a delay in negotiating the base rights with your NATO allies impede the IRBM program?

General WHITE. It would impede deployment of the IRBM to those countries in which base rights were not obtainable from them.

Senator JOHNSON. Will such delay involve serious risks to the mutual security of the free world, in your opinion?

General WHITE. I think it is highly desirable that they be deployed as rapidly as possible.

Senator JOHNSON. The answer is "Yes"?

General WHITE. You have put that in a very broad context. From a strictly military point of view I think it is desirable they be deployed as rapidly as possible.

Senator JOHNSON. You don't think the risk would be serious if they were not?

General WHITE. I think that as the ICBM comes along, and with our manned bomber force, it is—I say again—highly desirable.

Senator JOHNSON. And you do not want to go any further?

General WHITE. I don't want to go any further than that because I think this has rather grave international overtones which it is not proper for me to comment on at this time, sir.

Senator JOHNSON. Would you elaborate on that in executive session?

General WHITE. If you wish me to, yes, sir.

Senator JOHNSON. General White, do you have any comments on the testimony of Secretary Douglas this morning which you would like to give the committee particularly if you differ at all with any of his testimony?

General WHITE. I think of no case where I differ in anything that he said.

Senator JOHNSON. General White, is the Snark a weapon that can assure our security?

General WHITE. No, sir; not by itself. It is one of the family of strategic weapons which together, I hope and believe, can maintain the security of this Nation.

Senator JOHNSON. Is it a fact that the Soviet Union cannot match the Snark?

General WHITE. Is it a fact that they cannot match the Snark?

I have no knowledge of the Soviets having a similar type weapon system.

Senator JOHNSON. It has been said that the Atlas has achieved a thrust of 335,000 pounds. Does this mean we are equal to the Soviets in ICBM development?

General WHITE. I think that is a very difficult comparison to make.

I think it indicates that we are not as far behind as many people think.

Senator JOHNSON. Do you think we are behind?

General WHITE. A little.

In respect to the intercontinental missile, yes.

Senator JOHNSON. Do you think we can catch up?

General WHITE. I do.

Senator JOHNSON. Do you think we have taken the steps that will assure us catching up?

General WHITE. With the single exception of a more rapid push on the Titan, which is another series of intercontinental ballistic missiles.

Senator JOHNSON. When have we taken those steps? Have they been accelerated since October 4?

General WHITE. They have not; no, sir.

Senator JOHNSON. There have been no step-ups to your knowledge since October 4?

General WHITE. Not on the Titan program.

Senator JOHNSON. On the entire missile program?

General WHITE. On the Atlas program; yes, sir.

Senator JOHNSON. General White, it has been said that the Jupiter-C missile has been fired as far as any Soviet missile.

Does this mean we are up to the Soviets in missile development, in your opinion?

General WHITE. No; I don't think that is an indication.

It takes more than distance.

You have to have guidance and a number of other things.

Senator JOHNSON. General, is SAC our only shield against attack at the present time?

General WHITE. Well, that is a little difficult—to say it is the only one. All of the services have a part, but SAC is unquestionably—

OVERRIDING POWER IS SAC

Senator JOHNSON. Do you think there is anything else, any other thing that is really deterring them?

General WHITE. Well, I think the air defense of this Nation is an element of deterrence.

I think the NATO shield is an element of deterrence. I think that our forces in the Far East are an element of deterrence; but the overriding power that this Nation has at the moment is the Strategic Air Command.

Senator JOHNSON. Would you care to give us your evaluation of the effectiveness of the Snark when used in quantity at low altitudes? Could the Soviets stop them?

General WHITE. I doubt it very much.

Certainly they would get some. A strategic attack would consist of a combination of a great many weapon systems which we hope would saturate their defenses, low altitude, high altitude, manned, unmanned, bombers, and ballistic missiles and eventually, I hope, space vehicles.

Senator JOHNSON. Is it fair to say, summarizing your testimony, that with the steps that have been taken in expediting the Atlas and with the general steps that have been taken throughout the missile field, that you are satisfied with the progress this Nation is making at this time, as you have testified, and that you would want your testimony, as it will be read through the years, to indicate that you felt we were doing all we should do now.

General WHITE. If you are speaking of the ballistic missile field, I would say "Yes" to that with the exception of the progress on the Titan ballistic missile.

Senator JOHNSON. Have you got any recommendations to make to this committee that you have not made?

General WHITE. I have a good many, sir, if you wish me to make them. The Air Force has a great many things it must do. We must push on with the ballistic missiles as we have discussed. We must provide greater dispersal and readiness for the SAC forces. When I say "readiness," we are inclined to think of hardware. I am thinking, also, of more highly trained people, better trained people, people that we can keep in the service.

Senator JOHNSON. That is the Cordiner report you are talking about.

General WHITE. That, and housing, Mr. Chairman. There are a great many things that go into the morale of a good fighting man. We must provide alert facilities that we do not now have for the SAC.

bombers, to enable them to take off with a load of weapons on very short notice. We must provide certain redeployments of our tanker forces to enable the tankers to be more forward in order to permit the refueled bombers to take advantage of heavier loads and go further, to get some of the deeper-in targets.

We require some additional tanker bases in the northern parts of this hemisphere. We must, as I have said, go on with all of the ballistic missiles field. We need particularly more research and development funds. We must get on with the antiballistic missile radar detection system. We must provide a defense against ballistic missiles.

We need to keep the force that we have now modern, because I foresee for a long time a requirement for a mixed bag of weapons, which includes, to my mind, high performance manned aircraft. We must keep those modernized. That involves such things as going on with the B-58, producing the new chemical bomber and the nuclear-propelled aircraft. The modernization of our radar and our early warning and our gap filler radars for warning and tracking of enemy manner bombers and control of our interceptors must be carried on.

We need to modernize to a greater degree, in my opinion, the tactical air forces, and we must get into the outer space business as fast as we can, not only for reconnaissance, but I actually foresee combat potential in that region, not only active—you might even have to have defensive satellites or space vehicles one of these days.

Senator JOHNSON. Without embracing or disagreeing with your views, I want to commend you for stating them so succinctly, so effectively and in such a short time. I think anyone who reads this record can understand what you are talking about without spending all day trying to find it out.

I want to ask you this question: No doubt to carry your recommendations into effect you are going to need some legislation and some money?

General WHITE. That is correct, sir.

Senator JOHNSON. I assume you have submitted your requests through channels for both.

General WHITE. I have, sir.

Senator JOHNSON. And I assume you have had action at the Air Force level on those requests?

General WHITE. At Air Force level; yes, sir.

Senator JOHNSON. And at the Defense Department level?

General WHITE. To a considerable degree; yes, sir.

Senator JOHNSON. Are you satisfied with the action that has been taken on those two stages?

General WHITE. At Air Force level. Not entirely at defense level.

TITAN AND AIRCRAFT MODERNIZATION PROGRAMS NEED PUSH

Senator JOHNSON. Would you tell us in what respect?

General WHITE. The Titan program has not been pushed as rapidly as I would like to see. The modernization program for the manned aircraft has not come along to the extent that I recommended.

Senator JOHNSON. Does that give you great cause for deep concern?

General WHITE. It gives me cause for a good deal of concern; yes, sir.

Senator JOHNSON. Why ?

General WHITE. This is a very critical time of judgment as to how long and to what extent you pay a great deal of money for exceedingly expensive aircraft.

Senator JOHNSON. What are the reasons advanced for denying your request in those specific respects?

General WHITE. I think it is a matter of differing judgment.

Senator JOHNSON. As to the necessity?

General WHITE. As to the necessity.

Senator JOHNSON. Have those requests which have been approved by the Air Force and the defense level been acted upon by the budget?

General WHITE. As I say, a good many of them have; yes, sir.

Senator JOHNSON. Satisfactorily?

General WHITE. To the degree I just stated, sir.

Senator JOHNSON. Thank you, General White, for your testimony. Counsel.

Mr. WEISL. General White, since the time element of the introduction of the Titan and the Atlas has been introduced, or has been introduced by the Secretary and yourself, without breaking security in any way, could you tell me whether the Titan has ever been tested?

General WHITE. It has not.

Mr. WEISL. Has it even reached a development stage?

General WHITE. Oh, yes. I was at the plant where it is being manufactured on Saturday.

Mr. WEISL. We have received a letter from the Martin Co., which is in charge of the Titan program, and they say as follows:

When development has reached a definitive state, we expect a production contract to manufacture service quantities.

According to this letter, the development has not even reached a definitive stage.

General WHITE. You asked me if it were under development, and it is.

Mr. WEISL. I did not say that, I am sorry, General. I meant to state has it even reached a definitive state of development?

General WHITE. I am afraid, Mr. Counsel, that the word "definitive" kind of froze me here. I actually saw a great deal of hardware in a great many buildings, including test stands, and actually saw missiles in the test stands at the plant.

Mr. WEISL. The company that manufactures the Titan says as follows, and I read again:

When development has reached a definitive state, we expect a production contract to manufacture service quantities in accordance with prototype specifications.

So they have not gotten a service type contract. The development has not reached a definite state?

General WHITE. You are putting details into my mind that I frankly cannot cope with. I think General Schriever or General Putt can give you that, but I will say this: I have said that I am not satisfied with the rate at which we are going on the Titan.

On the other hand, it certainly is under development.

Mr. WEISL. Yes, sir. In connection with the time element for either the Titan or the Atlas, how long does it take to build a base for either one of these weapons?

General WHITE. I would certainly say based on past experience in constructing airbases, that 18 months to 2 years is normally required.

Mr. WEISL. And if any one of your men had told us that it might require as much as 40 months, you would say that they were off?

General WHITE. Forty months?

Mr. WEISL. Forty months.

General WHITE. Well, it seems to me that is an excessive amount of time. We have not had experience with hardening bases. By that I mean putting them underground or in mountains and so on. That certainly takes longer and also the design criteria is something new in our experience.

Mr. WEISL. Have any bases been constructed for launching the ICBM?

General WHITE. We are in process right now of constructing one at Camp Cook, Calif., the first.

Mr. WEISL. How long do you estimate the construction of that base will be, if you can properly state it? I do not want you to say it publicly if you should not.

General WHITE. It is under construction now, coming along. I cannot give you a number of months, but I think it will have taken 18 months, roughly, from the time that we decided to go ahead with it. I cannot remember the date that we gave the go-ahead.

Mr. WEISL. Also, in order to make ICBM missiles operational, you have to train specialized crews, do you not?

General WHITE. That is correct, sir.

Mr. WEISL. How long do you think it will take you to train specialized crews?

General WHITE. I believe in that rather complex business that with men who have basic mechanical, electronic, and other similar skills, 1 year is adequate.

Mr. WEISL. And are you now taking steps to train such crews?

General WHITE. We have a phased program in which we intend to produce the trained people at the time they are needed.

Mr. WEISL. What do you mean by "that type of program," General White?

General WHITE. I said a phased program.

Mr. WEISL. A phased program?

General WHITE. Phased program.

Mr. WEISL. Oh, I am sorry. General White, you have perhaps the greatest responsibility for protecting the United States of any man in the United States. As Senator Symington has so often pointed out, ICBM's and even IRBM's are weapons of the future. If we were attacked today or tomorrow or next week or next month, we would have to depend on your Air Force; is that correct?

General WHITE. That is correct, sir.

QUESTION OF THE JOINT CHIEFS OF STAFF

Mr. WEISL. In discharging those responsibilities, do you find that there are too many administrative duties imposed upon you?

General WHITE. I suppose you are leading up to a JCS matter.

Mr. WEISL. Let me state why I asked the question.

General WHITE. I will be helpful, sir.

Mr. WEISL. I assure all of you gentlemen that I am not trying to be a cross-examiner. I am trying to get out the facts as best I can.

General WHITE. I will do my best to give them to you.

Mr. WEISL. If any question, General, is unclear, or if you think it is leading to something, please stop me and say, "What is the basis for that question?"

General WHITE. I so asked you in this case.

Mr. WEISL. Yes, sir. Now, Robert Lovett, with whom no doubt you are acquainted—

General WHITE. Yes, sir.

Mr. WEISL. He was Secretary of Defense for a while, and he was in the military service and in the State Department for a great many years before that, and he made a soul-searching study of the problem that men like you face in the military service. And when he retired, he wrote a letter to the President, and among the paragraphs in that letter there was the following:

One of the major difficulties with the present Joint Chief of Staff—

And you are one of them—

General WHITE. That is right.

Mr. WEISL (reading:)

Organization is that they are grievously overworked as a result of the great volume of papers referred to them for their views. In consequence, they are too deeply immersed in the day-to-day operations, frequently of an administrative character, to have adequate time to devote to their major responsibility: the preparation of overall joint and combined strategic plans, the development of logistic plans, the review of such plans in the light of the materiel and personnel situation, and the effect of new weapons.

Do you agree with Secretary Lovett's conclusions?

General WHITE. I think I could go further, sir. As I interpret that, he was talking about overloading of the Joint Chiefs of Staff themselves. I believe that is the way that reads.

Mr. WEISL. Well, he was overloading the Joint Chiefs and also—

General WHITE. As Joint Chiefs?

Mr. WEISL. As Joint Chiefs.

General WHITE. And has not commented at all on the fact that the members of the Joint Chiefs are, in addition, the military heads of their respective services.

Mr. WEISL. Do you not think that is putting too great a load on a man like you who has got to defend the United States against attack and think and think and think and lay awake nights figuring how best to do that, and worry whether the force in being is properly supplied and manned, and whether the bases are dispersed properly, and so forth?

Do you not think it is unfair, and do you not think it is inefficient and dangerous to put upon you all of these administrative responsibilities that Secretary Lovett points out?

General WHITE. I would say this, sir: that I personally have great difficulty making 24 hours a day go far enough in doing what I consider being twofold jobs—that is, Chief of Staff of the Air Force and a member of the Joint Chiefs of Staff.

Now, as to the solution for it, I am unable to give a clear-cut one. I have thought about it a great deal. It is possible to delegate a great

deal of the duties of the Chief of Staff to the Vice Chief of Staff; but that does not get the Chief of Staff himself out of a great many things that he must be in because of his position.

HE WOULD GO SLOW ON REORGANIZING

In saying all of this, I would counsel that a reorganization of the Joint Chiefs of Staff not be made a matter of precipitate action but be studied at great length, because there are many things that are not apparent and that should be very carefully looked into.

I do agree that they are overloaded, one, as members of the Joint Chiefs of Staff and, two, as military heads of their services.

I am speaking for myself. I do not put that in the plural.

Mr. WEISL. General White, I am sure that this committee would not act in haste, or without the proper evidence or the proper background. But it is a fact, is it not, that when a man like you as head of the Air Force has upon his shoulders the responsibility of defending this country with practically the only force in being, that you ought to be relieved of day-to-day administrative responsibilities and a lot of paperwork and a lot of speeches and a lot of meetings with committees, and so forth?

General WHITE. I can agree with practically all of that, Counsel.

Mr. WEISL. Thank you.

Senator SALTONSTALL. Mr. Weisl, you did not intend to include committees of Congress, did you?

Mr. WEISL. Even committees of Congress.

General WHITE. I could have thought of several more, Senator.

Mr. WEISL. I am sure the committee agrees with that. But, when we have seen here how difficult it is to get the facts from witnesses, from some witnesses for Congress, you can see why it is necessary for committees to probe and probe and probe constantly, in order to know what the Congress can do to remedy the defects in the system.

I know that Senator Symington does not enjoy having meetings and meetings and meetings with his committee, but what is he going to do when he cannot get the facts out and cannot get action on the facts?

Now General White, as Chief of Staff of the Air Force, what do you regard as the most important things to be done to insure our survival in the face of the Russian threat?

General WHITE. I believe, sir, that I outlined those in response to Senator Johnson's question.

Mr. WEISL. Yes; I believe you have. You need not repeat them. Is there anything you want to add to that?

General WHITE. Yes; I think there are some things I should add to that, things that I believe are important enough for this committee to consider in that respect. I am not sure that I spoke of the human element.

There must be more incentive for a man to make the military service a career. I am talking not only of skilled airmen, but of officers, and I am not being subjective when I say general officers included. The responsibilities of the tops of the service today are so much greater than they were in any time in history, I cannot overemphasize that.

Another very important thing is the day-to-day operating funds. If you have all of these units and sufficient maintenance and operation funds are not provided, you cannot keep it on its toes ready to go.

I may have mentioned those when I answered Senator Johnson, but I want to repeat them, not because they are more important, but I want to make sure that they are among the things that I have stated.

Mr. WEISL. And, General, if you will be good enough to add just one little bit more to your administrative duties, if you can get your staff to give the committee a memorandum specifically stating the things that have got to be done, in your judgment, to make this Nation safe, I am sure the committee will appreciate it.

General WHITE. I will be glad to do that, sir.

(Copy of General White's letter dated January 9, 1958, together with enclosure 1 follows:)

DEPARTMENT OF THE AIR FORCE,
OFFICE OF THE CHIEF OF STAFF,
UNITED STATES AIR FORCE,
Washington, D. C., January 9, 1958.

HON. LYNDON B. JOHNSON,
Chairman, Preparedness Investigating Subcommittee, Armed Services Committee, United States Senate.

DEAR MR. CHAIRMAN. On December 17, 1957 Mr. Weisl requested that your subcommittee be provided a written statement of the recommendations for maintenance of national security which I had made during my testimony before the subcommittee and any additional recommendations which I might wish to submit.

I am forwarding my recommendations in two forms. The first is an unclassified summary of recommendations which I believe should be useful for your open record (enclosure 1). The remainder of the enclosures are amplifying details of appropriate recommendations (enclosures 2 through 17); for the most part, these detailed statements had to have security classifications.

Sincerely yours,

THOMAS D. WHITE,
Chief of Staff.

RECOMMENDATIONS BY CHIEF OF STAFF, UNITED STATES AIR FORCE, ON THINGS
TO BE DONE TO MAKE THIS NATION SAFE

The problem faced by the United States today is: "What can we do to achieve an assured superiority in developing a continuously effective deterrent while maintaining readiness to meet the threat of Soviet capabilities?"

We in the Air Force are addressing ourselves to this problem in a positive way and are seeking to accomplish the following:

- A. To improve our present deterrent capability :
 1. Accelerate the dispersal of the SAC strike force.
 2. Improve SAC ability to respond instantly to any aggression by provision of the necessary alert facilities.
 3. Improve the ability of the SAC tanker force to support the offensive effort by accelerating forward redeployment of the SAC tanker force.
 4. Provide additional tanker bases in the northern part of our hemisphere.
 5. Improve the quality of our SAC, TAC, and air-defense forces by modernization in missiles and aircraft, including both chemical- and nuclear-powered bombers and their supporting environments.
 6. Provide adequate operation and maintenance funds to improve our current combat capability and maintain it on a continuing basis.
- B. To achieve an assured superiority :
 1. Concentrate on achieving useful missiles and spacecraft in operational quantities by (a) accelerating production of ICBM to achieve early significant operational capability and deployment; (b) accelerating production of IRBM to achieve early significant operational capability and deployment; and (c) proceeding with active space programs.
 2. Proceed with a vigorous and sound research and development program to develop without delay a ballistic-missile defense composed of (a) ballistic-missile warning system; and (b) anti-ICBM missile.

3. Continue to expand our research and development programs in other areas.

4. Take steps to improve the collaboration among scientists of the free world.

A vital element in maintaining and improving the quality of our forces is the retention of highly trained and skilled personnel. Additional incentives for military careers must be provided for both airmen and officers, primarily in the areas of pay and housing.

In brief, we must maintain and improve our Air Force posture today while we phase in the weapons of tomorrow and press vigorously forward into the space weaponry of the more distant future.

Mr. WEISL. Now, we have heard evidence, and I have heard in my interviews, the subject of the indivisibility of airpower. Would you mind explaining that factor to the committee, please?

General WHITE. Well, I think it stems primarily from the fact that the air is indivisible. Take the relationship between a defensive organization and an offensive organization, the continental United States, for example. Why should the air defense and the air offense be under the same overall control? If we have strategic bombers moving out or in, going to or from a strike, the defense forces must be closely allied with them so that we do not shoot down our own forces. The control has to be exceedingly tight.

Mr. WEISL. Yes, sir.

General WHITE. I think those are the main points.

Mr. WEISL. General White, we have had testimony concerning the necessity for preparing not only against intercontinental attack, but also the necessity of properly preparing for so-called local wars or limited wars.

What part does the Air Force play, and what readiness does it have for that type of warfare?

General WHITE. The Air Force has two types of forces which play a large part in local war. One of them you might say has it as a primary job, and that is the Tactical Air Command. So-called tactical air forces are deployed to the various theaters around the world, in Europe, the Far East, and so on.

There are tactical air forces in this country which are earmarked in event of general war to back up these forces overseas; but for local war they are deployable, and they have the refueling capability to go to any part of the world to take part in local or limited war.

Moreover, the Strategic Air Command can, because of its long range and its flexibility, without moving from its general war positions, bring to bear its very great forces in a local war situation.

Of course, the airlift and the logistical airlift all have a very great part in any local war that may come about.

AIR DEFENSE SYSTEM OF UNITED STATES

Mr. WEISL. We have an air-defense system in the United States, do we not?

General WHITE. We do.

Mr. WEISL. Would you please tell the committee how that is organized?

General WHITE. The Air Defense Command—well, let's start over.

We have a Continental Air Defense Command. It has just recently been worked out with the Canadians to combine into what we now

call the Air Defense of North America, NORAD. Its components are the Air Force Air Defense Command, which includes the manned interceptors, the radar early warning units, the Army anti—I think it is now called the Army Air Defense Command—which is the Army allocation to CinCNorad of certain Nike and other air defense weapons, and a contribution by the Navy of at least one interceptor squadron, and all other appropriate fighter types ashore and available in this country.

In addition to that, the fighters of the tactical air forces are also earmarked for backup to the Continental Air Defense.

In addition to that, there are certain arrangements with the Canadian Government whereby the Canadian Air Force and the United States Air Force cooperate.

The major elements of it are distant early warning line, which runs across the top of this continent with its extensions both in the Pacific and into the Atlantic. There is a midline in Canada, and there are the close in radars, relatively long-range radars and gap-fillers, and which provide the tracking and the control of the various weapons systems against incoming enemy attack.

Mr. WEISL. Have you any suggestions, General White, to make as to how our continental defense can be strengthened?

General WHITE. I would say that there are a number of things that must be done. We must—and I am speaking now, let me state, of a principle of air defense. Proper air defense demands that the enemy be struck just as far from his targets—in this case I am assuming it is in continental North America—as far from his targets as possible.

Now, while it is not generally recognized, I would say that the Strategic Air Command is perhaps the major contributor to the air defense, because these forces will hit the enemy at his point of launching.

The next best place to hit the enemy is immediately after he takes off—and successively the circumstances of defense become less desirable until you get a point defense right over the target, which is the last-ditch defense and the least desirable.

We have the early warning line, which is to alert all of the defensive forces, to get the SAC off, to alert the population for civil-defense purposes; and then these other lines. If you had an ideal defense, from the very time the enemy were sighted you would have him under surveillance and under attack, all the way to his targets.

There probably isn't enough money in the world to do that sort of thing. But what we do have is distant early warning, which alerts the forces. Then you next have the midline, which helps you to know more about the direction of the attack. It helps you deploy your defensive forces better—and of course the Canadian Air Force begins to come in there.

Then as attackers come into our own country boundaries, we have the perimeter defenses of fighter-interceptors at this time, making a perimeter around the United States, and in some interior important locations.

The Bomarc, which is a guided missile of about Mach 3 performance, is coming in just as rapidly as we can bring it in.

This is all tied into the very complex electronics system known as SAGE, which will feed in automatically the data required to control

great numbers of defensive weapons against great numbers of incoming targets.

In addition to the fighter-interceptors, as the attackers come closer to the actual target, there would be weapons such as the Nike as a final, last-ditch point defense, exactly over the target.

Now, the same thing applies—except you do not have them yet—in the defense, the detection and the defense against ballistic missiles, when they come, and I can even see in the future a similar requirement for combat vehicles actually operating in space. I think that is still some time away.

Those, roughly, are the requirements.

We need to complete the extensions of the DEW line. We need to improve our radar. We need to develop more rapidly and to deploy the radars required for the antiballistic missile detection.

We need to get on with the more advanced and more sophisticated interceptor system, such as the Bomarc. We need to keep modern our fighters, our manned fighter-interceptors, and we must develop an active weapon against ballistic missiles.

Now, that is probably one of the most complex technical problems that there is, and I have no idea what the answer to it is. But we must put a great deal of effort on getting on with it.

I think those are the essentials of the requirements of air defense, and we must get on with it.

Mr. WEISL. Is the Continental Air Defense Command under one command, or is it a joint command?

General WHITE. The Continental Air Defense Command is what we call a joint command. It is commanded by General Partridge of the United States Air Force, a United States Air Force officer, who operates under the Joint Chiefs of Staff through the Air Force as the executive agent.

Mr. WEISL. And you think that the chain of command is sufficiently effective to be operational in good time?

General WHITE. I do.

Mr. WEISL. Now, the DEW line and the SAGE line are the early detection or warning systems?

General WHITE. The SAGE is more a control system. It takes the product of the—

Mr. WEISL. What warning systems do we have at the present?

General WHITE. We have the DEW line, the mid-Canada line, and the United States perimeter lines, and the interior radar systems.

Mr. WEISL. Are these systems subject to jamming by decoys?

General WHITE. Yes, they are, some of them.

Mr. WEISL. Are we working on improvements?

General WHITE. We are, very much.

Mr. WEISL. Have we any warning system against intercontinental ballistic missiles?

General WHITE. I think that it is fair to say that we have only a very, very limited capability—that is by certain highly experimental and highly classified technical developments.

Mr. WEISL. Very good. And perhaps we shouldn't discuss the early-warning system at all in open session. Is that your opinion, General?

General WHITE. Well, I think any greater detail than I have gone into should not be, sir.

Mr. WEISL. Have you any opinion as to the concept for deploying and operating IRBM's and ICBM's?

General WHITE. Well, I am sure that they will be of great advantage to any nation that lies within the scope of the missiles' range with relation to targets in the Soviet Union.

Specifically, I think of the United Kingdom, I think of countries in the NATO area; and I have in mind a requirement, for our own use, of these weapons in such places as Alaska, in Okinawa, and possibly some other places in the Far East.

Mr. WEISL. Are there any answers or any suggestions that you would like to make, General, that have not been covered by my questions?

General WHITE. You have given me an opportunity to make a good many, sir. I think I have covered the most important ones.

Mr. WEISL. Thank you very much, General.

Mr. Chairman, that concludes counsel's questioning of General White.

Senator JOHNSTON. The committee will take a recess for 5 minutes. (Short recess.)

Senator JOHNSON. The committee will come to order.

General White, I want to say again I am very proud of the way which you candidly and frankly answered the questions and the way you presented your case. You did it succinctly and effectively. I know that each member of the committee will have some questions that he will want to ask you. At the moment I think I will call on Senator Flanders to see if he has any questions of General White?

Senator FLANDERS. I do not have any questions, sir.

Senator JOHNSON. Thank you.

Senator SYMINGTON?

Senator SYMINGTON. Mr. Chairman, I would like to associate myself with your remarks, and say also that those of us who believe in adequate airpower are very grateful for the consistently fine job that has been done by Secretary Douglas.

As for General White, one of my oldest friends in the Air Force, all I can say is he is vindicating the complete confidence many of us have had in him for a long time.

May I ask a question of the Secretary?

Senator JOHNSON. Proceed, Senator.

Senator SYMINGTON. Mr. Secretary, if you would prefer to have General White answer, that would of course be satisfactory.

There was some discussion of space and missile programs, the inference being that there was some advantage in their being separated. The facts are, are they not, that the space programs and the missile programs are in effect intertwined together? Missiles involve the conquest of space and the conquest of space involves missiles; is that a fair statement?

Secretary DOUGLAS. They are very closely associated.

Senator SYMINGTON. Is there any way that you can segregate them? They go together, do they not?

Secretary DOUGLAS. I think that where you find distinctions in when you are talking about manned vehicles, whether vehicles such as the X-15 are manned satellites, you have wholly new problems associated with the characteristics, capabilities of manned. Otherwise, I think the two go together, sir.

Senator SYMINGTON. On October 4 we had what Dr. Teller called a technological Pearl Harbor. Since that time, with the exception of the replacement of the 10-percent reduction in research and development funds, which have never actually been taken away, and with the exception of some of the missile program, there has been no acceleration, to the best of my knowledge, in any program for the Air Force. In addition, to the best of my knowledge, there has been no replacement of any of the reductions that were made in the fiscal year 1957. If there have been, I wish you would tell about them this morning.

Secretary DOUGLAS. I don't quite understand the Senator's statement with regard to no action of acceleration, because quite definitely in the IRBM program—

Senator SYMINGTON. I said with the exception of missiles.

Secretary DOUGLAS. I am sorry. We have—perhaps the Senator covered this—reestablished and increased funds available in the 1958 program in research and development. Now this in part was going back to where we were, but we have also gone somewhat further.

NO RETRACTION OF CUTS IN MAINTENANCE AND IN PLANES

Senator SYMINGTON. I did cover the research and development. There was \$1,700 million. 10 percent of that was taken out. 170 million was cut out; and then Secretary McElroy replaced in November the planned cut of Secretary Wilson in August.

Has there been any restoration of maintenance and operation funds for the Air Force, exclusive of missiles?

Secretary DOUGLAS. No, sir; there has not.

Senator SYMINGTON. Has there been any restoration of the tremendous reduction in the procurement of airplanes?

Secretary DOUGLAS. No; there has been no increase in that program.

Senator SYMINGTON. Has there been any replacement of the decrease that was made in 1957?

Secretary DOUGLAS. I would say there has not been.

Senator SYMINGTON. Has there been any replacement of any of the funds cut from personnel and training?

Secretary DOUGLAS. Yes; there was a cut in personnel funds in the 1958 program. There has not been any replacement.

Senator SYMINGTON. If you are putting more funds into the ballistic-missile picture, and have not come to the Congress for more money, you must be taking it out of other programs; are you not?

Secretary DOUGLAS. With respect to the IRBM program, it is not necessary for the Air Force to seek any considerable or any large increase in funds to start that program on the accelerated basis at this time.

We will, with the approvals we now have, be approaching the chairmen of both Appropriations Committees to advise them that we expect to use obligational authority really otherwise programed without affecting those programs at this time, until favorable action can be taken to supply the additional funds required for both the ICBM and IRBM accelerations.

Senator SYMINGTON. Now let me ask, you are coming up before the Congress next month?

Secretary DOUGLAS. Yes, sir.

Senator SYMINGTON. And are going to present a budget; right?

Secretary DOUGLAS. Yes, sir.

Senator SYMINGTON. And you are going to back that budget?

Secretary DOUGLAS. I expect to.

Senator SYMINGTON. If it is cut, as it has been each of the last 5 years I have been in the Senate, are you still going to back it?

Secretary DOUGLAS. Senator, I think that is hard to tell. I am sure that the budget that will be presented, including a supplemental, that will reflect most of the recommendations that I have made and that were made by the Air Force to me.

Senator SYMINGTON. You say the Atlas program has been accelerated since sputnik?

Secretary DOUGLAS. Yes, sir.

Senator SYMINGTON. Would you furnish this committee with any written directives that have been sent to that company, as of today, which verify that statement?

Secretary DOUGLAS. I shall, and I recall to the Senator the fact that I said at this time I cannot say of my knowledge that the acceleration has been ordered to the company.

The approval in the Secretary of Defense's office was only a few days ago, and I would like to be sure that the Senator understood me in some of my answers to his earlier questions when he said that Mr. Holaday had approved the program.

I referred only to the Atlas program recommended, and not to the whole ICBM program.

(Subsequently the Department of the Air Force furnished a memorandum titled "Acceleration of Atlas Program" which follows:)

ACCELERATION OF ATLAS PROGRAM

Two formal directives have been provided to Convair concerning the acceleration of the Atlas program. The initial directive was forwarded to the Air Force plans representative in the Convair San Diego office and is quoted as follows:

"BMD MCPTC-12-281-E, 17 Dec 57. Authorization has been received from Headquarters, USAF, for acceleration and augmentation to the current planned production program. Details regarding rates, schedules, site activation dates, etc., will be forwarded shortly. In implementation of this plan, overtime limitations already have been removed and, since maximum assurance of success is desirable, additional funding will be available to reduce risks wherever possible."

A second classified message directive confirming earlier verbal directions was forwarded direct to Convair by the AFBMD December 21, 1957. In essence, it sets forth details of delivery schedules, program objectives, and contractual arrangements and require immediate implementing steps on the part of the contractor.

Senator SYMINGTON. Mr. Secretary, if you wish, you can later change the record.

You don't have to worry about it now.

Secretary DOUGLAS. Right. I think that it was fully clarified by General White.

Senator SYMINGTON. As long as you are bringing up the past, if you further cut the production per month of the Snark one more per month, would you have any production left at all?

Secretary DOUGLAS. Yes, sir.

Senator SYMINGTON. If you cut it by one per month, you would still have some production left.

Secretary DOUGLAS. According to the best information that I can give you today; yes.

Senator SYMINGTON. Would you check that for the record?

Secretary DOUGLAS. I will be happy to.

(Subsequently, the Department of the Air Force filed a memorandum on Snark production, which is included in the classified records of the subcommittee.)

Senator SYMINGTON. General White, you give the impression that, in effect, you have what you want, and are happy with the setup—I am not talking about this proper romance we are all going through in missiles as the result of sputnik, but about the Air Force and its commands, SAC, Air Defense, and so forth.

Do you want to leave the impression with the committee that you are satisfied with these programs?

General WHITE. I do not, sir, and I think I have delineated about 5 or 6 very important things that we must do.

Most of them we are planning to do, and some of them we have underway.

Senator SYMINGTON. I was listening to your answer to the questioning of the chairman and the counsel.

You will need a great deal more in your opinion in order to protect the security of the United States; will you not?

Secretary DOUGLAS. We need a considerable amount more.

Senator SYMINGTON. What is the difference between considerable and great deal?

Secretary DOUGLAS. I am not real sure, sir.

Senator SYMINGTON. Thank you, Mr. Chairman.

Secretary DOUGLAS. I think I should not talk figures at this time.

Senator SYMINGTON. Why not?

Secretary DOUGLAS. I think that is something that the President has to send over to the Congress.

Senator JOHNSON. As I understood his testimony, Senator Symington, he said he had requested it and it has been approved at the Air Force level and the Defense level, generally speaking.

Secretary DOUGLAS. That is correct, with the exception of some things.

Senator DOUGLAS. Senator Bridges?

ROCKET TO THE MOON

Senator BRIDGES. Mr. Secretary, the Russians have made the statement that within a year they are going to shoot a rocket to the moon.

Do you think that is pure propaganda, or do you think there may be something to it?

Secretary DOUGLAS. I think it might be done, at least a rocket to the vicinity of the moon.

I understand that as a target proposition it presents some real technical difficulties.

Senator BRIDGES. It is a thing we must watch?

Secretary DOUGLAS. Yes; I think there is a very real possibility.

Senator BRIDGES. Do you think that we will be able to do that some time?

Secretary DOUGLAS. Yes; we can if we want to.

Senator BRIDGES. We can if we want to?

Secretary DOUGLAS. That is right.

Senator BRIDGES. Within the foreseeable future?

Secretary DOUGLAS. I would say within the foreseeable future.

Senator JOHNSON. Is that all, Senator Bridges?

Senator BRIDGES. Yes.

Senator JOHNSON. Senator Saltonstall?

Senator SALTONSTALL. Thank you, Mr. Chairman.

Mr. Chairman, I would like to ask General White one question.

General, we have been discussing principally weapons of the future, their research and development, their operation.

In doing so we must not in my opinion overlook the present, the building of planes, bases, and the operation and maintenance of a trained Air Force.

When we talk of priorities, is not the very top priority in your opinion the M. and O., the maintenance and operation of our present forces, personnel incentives, training, and living conditions?

I would like to have you elaborate a little on that.

You mentioned nine things you needed.

The last two were the day-to-day operations and the human elements with their incentives.

Is not the very top priority today—what you want as Chief of Staff of the Air Force—the maintenance and operation and continuance of the building of your personnel and weapons?

General WHITE. Purely philosophically, you could make quite a story. When you say top priority, I prefer to put it this way: That to make your force effective, regardless of how much hardware you may have, bases and installations, people are needed. If you don't have the operating funds to keep that force ready, the people trained, the force exercised, then it is of no value; so it is equal priority, in my opinion, to maintain the readiness of your force; it is equal priority to having the force.

Senator SALTONSTALL. That is fundamental, is it not?

General WHITE. That is correct, sir.

Senator SALTONSTALL. And it is fundamental with any consideration we are giving to the future for these new weapons and development.

General WHITE. It is particularly fundamental to as complex and technical an organization as the weapon systems that comprise the Air Force.

Senator SALTONSTALL. And we must never let ourselves—

General WHITE. Never let ourselves down.

Senator SALTONSTALL. Mr. Chairman, thank you.

Senator JOHNSON. Senator Kefauver?

Senator KEFAUVER. Thank you, Mr. Chairman.

I would like to ask General White or Mr. Douglas about our cooperation in working on these scientific matters with the French and British Air Force.

I had the privilege of seeing the air show in London this past fall, and they had some very good developments and I wondered if we are working on the problems together and what recommendations you have in that regard.

General WHITE. I believe we should do very much more, if I might take the question, Senator. I think that it behooves the United States to join in much more in the scientific fields with our allies.

There is a great deal of scientific talent in Europe we are not presently able to take advantage of, and vice versa. If they have some

knowledge we don't have, and we have some that they don't have, together I think we can go further faster.

Senator KEFAUVER. Do you have a plan to do that or is that just a wish you are expressing?

General WHITE. I have to be rather narrow about it because it is not in my province to do anything about it except make recommendations on appropriate occasions.

Senator KEFAUVER. Is it in Mr. Douglas' province to do something about it?

Secretary DOUGLAS. I think the Air Force sometimes carries out plans that it recommends, but the real point of contact for cooperation with our allies in the Defense Department is in the Office of the Assistant Secretary for International Security Affairs under the Secretary of Defense.

In all our training program activities and our military assistance activities, they are handled by that Office, and a good deal of the cooperation that I take it the Senator refers to ties into our military-assistance programs.

General WHITE. May I add something, Senator Kefauver?

The Air Force does within the limits of law and policy all the cooperation with our various allied Air Forces that we are permitted to do. We have laid great stress on it.

Senator KEFAUVER. Are you restricted by any law you think should be changed?

General WHITE. We are restricted by law and by policy both.

Senator KEFAUVER. Specifically did you or Mr. Douglas recommend any change of law to permit you to cooperate more fully?

Secretary DOUGLAS. I think, Senator, perhaps the best question is that these matters are receiving intensive consideration in the present NATO meeting, and we will be able to advise the committee better on this subject matter after the close of that meeting.

CONTACTS WITH AIR FORCES OF ALLIES

Senator KEFAUVER. Just as a matter of general information, exactly what is the connection between the NATO Air Force, and our United States Air Force?

Secretary DOUGLAS. Sir?

Senator KEFAUVER. What is the line of communication?

General WHITE. You might say the chain of communication between the United States Air Force and the Air Forces in NATO is strictly through the SACEUR, Supreme Commander of the forces in Europe for NATO and we have various means of communication through his representatives in Paris.

We have for certain purposes direct contact.

For instance, in the assistance area, the military assistance groups that we have, the training missions and so on, and for logistical purposes we have a direct contact.

We also have special arrangements with the RAF whereby there are exchanges of officers.

There are RAF officers here in this country and United States Air Force officers serving with the Royal Air Force in London.

Senator KEFAUVER. That is all I believe.

Senator SALTONSTALL. Mr. Acting Chairman, I thank you.

I have asked my questions.

Senator STENNIS. Senator Bush is next, I believe.

Senator BUSH. I yield my time.

Senator STENNIS. Senator Barrett.

Senator BARRETT. I would like to ask General White about the Atlas and the Titan. As I understood you some time ago, you stated you were not satisfied with the funds that were available for the Titan at this time and you wanted additional funds.

If there were a choice between prosecuting the Atlas and getting additional funds for the Titan, would that be your preference?

You would not want to hold up the Atlas in order to get funds for the Titan, would you?

General WHITE. I think the situation requires both.

I think we should have a follow on to the Atlas, which the Titan is.

It is a more advanced system in the intercontinental ballistic missile field, and it was started later and is behind, and will continue to be, but I think it should be brought along at a greater rate in the developmental stage than it is now.

Senator BARRETT. But you still believe that the Atlas should be pushed, put on an operational basis as quickly as possible?

General WHITE. As quickly as possible; that is right, sir.

Senator BARRETT. You would not delay anything?

General WHITE. I would not delay the Atlas program in order to give more to the Titan program. I would continue the program of the Atlas and speed up the Titan program.

Senator BARRETT. Tell me, both of these ICBM's, would they be such that they could be used on the same base?

General WHITE. Well, I think as a matter of practice we certainly would not use them on the same base. Their guidance systems and general electronics requirements are not the same. I am not a great expert in the field, but I am sure you could not launch the Atlas and guide it with the same system that you can a Titan and, vice versa. They are different systems, and that is the reason for having them. One is a different approach from the other, and it is well to get on with both, in my opinion.

Senator BARRETT. The Titan is a more advanced missile also than the Atlas?

General WHITE. Yes. You might say it is a later design. The Atlas is the very first of these things.

Senator BARRETT. That is right.

The thing that disturbed me a bit, General White, was that, perhaps, you thought the Titan, being a later design and a more advanced missile, would replace the Atlas.

General WHITE. Do you mean now or later?

Senator BARRETT. Well, I should say probably later.

General WHITE. I don't think so because I believe that, just like manned aircraft, we will find that the basic vehicle can be modified in the light of experience. We are modifying B-52's right now. We find new things that ought to be done. I think the same sort of process will go along with guided missiles, but the Atlas is a good missile so far as we can tell, and we ought to get on it just as fast as we can.

What we know about the Titan, it seems to warrant, in my opinion, going on faster with it than we are.

Senator BARRETT. Could you tell me whether the Russians are following the type of the Atlas or of the Titan?

General WHITE. I cannot, sir.

Senator BARRETT. Thank you, Mr. Chairman.

Senator STENNIS. Mr. Chairman, may I have 1 minute?

Senator JOHNSON. Yes, Senator Stennis.

Senator STENNIS. I want to call Senator Bush's attention especially to this, and my question is for the Secretary.

Mr. Secretary, I had to go to the telephone, and I came back and something had been said by Senator Bush about the Cordiner report, and I understood you said that you endorsed it wholeheartedly; that is correct, is it not?

Secretary DOUGLAS. Yes, sir, that is correct, Senator.

HEARINGS PLANNED ON CORDINER REPORT

Senator STENNIS. Well, the Cordiner report is mentioned from time to time, and I think maybe I ought to say something about the status of the hearings.

We have a subcommittee of the Armed Services Committee on the Cordiner report, and we have had hearings to the extent that we heard Mr. Cordiner, a very fine witness indeed, and then we submitted a large group of questions, I think 59 questions, on the Cordiner report to the Department of Defense. That was last January 15—I mean, excuse me, July 15, and as late as November 27, there has not been any answer to those inquiries. But we got a partial answer some time about the 28th, I think, of November, and we have urged them to supply the rest of the answers, so as soon after January 1 as possible, we certainly plan to continue hearings on that report.

I notice it is frequently said that the adoption of the Cordiner report would save \$5 billion, and that is a considerable sum of money, and those who endorse it wholeheartedly undoubtedly endorse that \$5 billion savings. But when we called on Chairman Cordiner to go into details on the \$5 billion, he said that that was not his recommendation, that was not his estimate. That is what the Department of Defense reported to the committee.

So that is another pertinent inquiry that goes back to you gentlemen in the Department of Defense, and we want the answer to that question as soon as we can.

Now, I want to make clear that I am in favor of some of the principles, too, of the Cordiner report, especially as to the increased pay for the specialists that you think you need.

Everyone, when they recommend the principles of the Cordiner report, feels that its primary purpose is to induce people to stay in the service; is that correct, Mr. Secretary?

Secretary DOUGLAS. That is correct, sir, technically qualified people; that is our prime interest.

Senator STENNIS. One provision of it provides, though, that those already retired from the service will get this same increase in pay. Do you endorse that part of it?

Secretary DOUGLAS. Personally, I think I endorse that part of it just out of a matter of fairness; I think you get into a fairly difficult question on that.

Senator STENNIS. What is the justification if the purpose of the provision is to induce people to stay in the service according to their technical skill? Why go back and pick up those who have been retired for some years, and pay them this increase?

Secretary DOUGLAS. Well, the justification would be that the people you want to stay in the service would receive an extra assurance that when they retired they would receive the same future benefits.

Senator STENNIS. I am talking about those who have already retired.

Secretary DOUGLAS. Well, what I said was, I think, applies, however, because if you started a precedent of not giving the benefits all the way across the board, then those who are now in the service may feel that such treatment is unfair and that they would or might receive such unfair treatment in the future.

I would rather not go into this one in detail, Senator. I look forward to our being able to make our presentation.

Senator STENNIS. Well, you said you unqualifiedly endorsed this report, and I have just asked you about one phase of it.

Secretary DOUGLAS. That is correct.

Senator STENNIS. Now, you want to say—

Secretary DOUGLAS. That is correct, sir; and I said I endorse that.

Senator STENNIS. Well, you say you endorse all of it including this part that I have raised?

Secretary DOUGLAS. Yes, sir. But it is a very long and a complicated report.

Senator STENNIS. I do not mean for you to go into the details of it.

That is all I have, Mr. Chairman.

Senator SYMINGTON. Mr. Chairman?

Senator JOHNSON. Senator Symington.

Senator SYMINGTON. Mr. Chairman, when my time comes, the distinguished Senator from Mississippi, for whom I have as much respect as anybody in the Senate, made a statement about the Cordiner report in these hearings some time back and I decided at that time not to answer it. I would now, when my time comes, like to make a statement about it because it is my bill that is in and I am on the committee with the very able Senator from Mississippi and I would like to make a couple of comments in the form of, with respect to my opinion about it, if I may when my time comes.

Senator JOHNSON. You can make them right now, Senator.

Secretary DOUGLAS. Mr. Chairman, might I make one further comment to Senator Stennis? I have represented myself as wholeheartedly in support of it, but I could not associate myself with the conviction that it holds out a prospect for \$5 billion savings.

Senator JOHNSON. I want to make this statement. We are going to have testimony cutting across these jurisdictional committee lines all through this hearing. I do not think there is a single witness that has not indicated that they recommend some business for the Appropriations Committee—some more funds—and we are not going to attempt to usurp the prerogatives of that committee.

The distinguished ranking member of this committee and the second ranking member are ranking members of the Appropriations Committee. We have had many witnesses who have recommended educational programs. The distinguished chairman of the committee on Labor and Public Welfare, Mr. Hill of Alabama, is an outstanding

authority in that field, and he has done a great deal of work in it and we are going to submit the complete record of this hearing to him, to his staff, and to his committee for such use as in their judgment they may want to make of it.

We have had numerous recommendations from many people about new facilities, about dispersal, about new plants that would have to be built and these would come before another subcommittee of this committee.

For the Cordiner report we already have a subcommittee set up especially to deal with that subject. I have no doubt that when the Congress gets back here in January, the Senator from Mississippi, in his usual diligent manner with the help of the Senator from Missouri and the rest of us who are interested in that subject, will concentrate on getting action in that field.

I just want to make it abundantly clear that the testimony produced here does not mean that this committee is either assuming jurisdiction or expects to take jurisdiction of subjects that the committee is not entitled to.

We want testimony on them. We would like to have the scientists tell us what we ought to do in the field of education and we want General White to tell us what we ought to do in the field of personnel, but that does not mean because we have accepted testimony that we are assuming jurisdiction. I want to allay any fears. I know of none that exist, but the chairman of the Appropriations Committee, the chairman of the Subcommittee on the Cordiner Report, and the chairman of any committee on facilities or the chairman of any other committee, they all should know here and now it is not my intention to bring anything under this tent that does not belong here.

Senator Symington.

Senator SYMINGTON. Mr. Chairman, I introduced a bill last May on the Cordiner Committee report, because I believe in the principles of that report. We had one hearing, in August, at which time we heard Mr. Cordiner.

Mr. Cordiner may not have been responsible for the \$5 billion saving estimate. I am sure if the distinguished Senator from Mississippi says that is true he is correct, because he invariably is correct in matters of that character.

But under my questioning, Mr. Cordiner said he thought the \$5 billion a year saving estimate was conservative. The word he used was conservative, based on his own study, and he also said the saving might approach \$6.3 billion annually.

Now, it is true that more money for retired officers is in the bill. Unless my memory is faulty, I have not read the record for months, I believe Mr. Cordiner said he felt that was the weak part of the bill.

On the other hand, many officers who are now in the services tell me that in their opinion it is justifiable, because it would have a great deal to do with people who are now in the services being willing to stay in the services.

In addition, I know that at first the Department of Defense backed the Cordiner recommendations. Later on, under the influence of that agency with great authority and little responsibility, the Bureau of the Budget, the DOD backing of the bill was reversed. If, as a result of instructions from the Bureau of the Budget, the Department of

Defense refuses to answer questions with respect to the bill, and because of not getting the answers is reason for not having the hearings, then putting it mildly, we are stuck.

Now, what worries me about this situation is that based on statements made me by active admirals and generals, I am convinced that the lack of application of the principles of the Cordiner report—no bill ever comes up exactly the way it is passed, at least I do not remember one—unless certain recommendations of that bill are put into force fairly soon, the deterioration of the relative security of the United States vis-a-vis the possible enemy can only accelerate. In recent days we have had two B-47's blow up, total loss both crews. We have had a B-52 blow up, total loss of all the crew but the tail gunner. I am especially interested in the death of those particular boys, because it is my belief that the Cordiner report, based on stories told by people like General LeMay, that the application of the principles of the Cordiner report would tremendously reduce the number of unnecessary accidents.

As soon as we can decide on whatever is the best in the Cordiner report and put it into effect, the sooner we will increase the security of the United States.

I thank the Chair.

Senator JOHNSON. Thank you, Senator Symington.

Thank you, Senator Stennis.

All Senators have concluded their questioning.

Senator BUSH. Mr. Chairman.

Senator JOHNSON. Senator Bush?

Senator BUSH. I would just like to say in a very general way that I very strongly agree with his views on that matter since he has made that statement.

I am sure that Mr. Stennis is basically in favor of this Cordiner report and I am glad to hear from the Senator from Mississippi that it is his intention to renew the hearings and press for the early consideration of this measure just as soon as we can possibly do it after the convening of the Congress, because I do believe from my own trip abroad this fall, visiting our command in different countries, in the Mediterranean, that the adoption of the principles of this report will have a lot to do with stabilizing our armed services and maintaining the high morale within them and also substantially reducing the costs of maintaining personnel.

Senator SYMINGTON. Mr. Chairman, a matter of personal privilege.

Senator JOHNSON. Senator Symington.

Senator SYMINGTON. Mr. Chairman, the distinguished Senator from Massachusetts very correctly points out in the record I might have said something about the death of these boys which would be misunderstood. I will correct the record, and want to say that the unnecessary accidents and deaths we go through are heartbreaking.

I heard only last night that, not counting naval air, the average death per day now is over two; I would like the record corrected and thank my friend from Massachusetts.

Senator STENNIS. Mr. Chairman, may I say this word?

Senator JOHNSON. Senator Stennis.

Senator STENNIS. Do I understand the Senator from Missouri is trying now to connect the deaths of these men, two per day, with the lack of action on the Cordiner report?

Is that the inference that we will draw from the Senator's remarks?

Senator SYMINGTON. Let me say to the distinguished Senator from Mississippi that my travels around the bases of the Air Force convince me that one of the reasons we have unnecessary accidents is the lack of adequate mechanics and adequate crew chiefs, and people under crew chiefs; and, therefore, I believe one of the most important reasons for establishing those parts of the Cordiner report we approve is that it will cut unnecessary accidents and therefore reduce deaths.

Senator JOHNSON. Senator Stennis?

Senator STENNIS. Well, that is a rather general answer, but as far as the committee hearings are concerned the door has been open all the time but I do feel that we are entitled to an answer to these 59 specific questions which pretty well cover this entire manpower field. Before we can get responses to those questions these general statements keep being made, but no one comes up with proof. I certainly would be ready to come up with a hearing at any time but I think if present conditions are actually causing fatal accidents why then certainly the Air Force, the Navy, and all the rest of them should be clamoring for action by the Defense Department as well as the committee and everyone else.

I think the vague statements about the deaths are just about comparable to some of the other vague statements about the reports.

Senator SYMINGTON. Let me say to the Senator of Mississippi I will be specific in answer to any questions he would want me to answer at this time.

Senator STENNIS. I don't want the inference to go out that the deaths are caused here by the failure to act on the bill, and it seems to me that that was the inference that you left.

But anyway, that is the status of the matter, and I hope that the Department of Defense will answer all those questions that they can answer or that are pertinent and get them in so we can make some study of it and be ready to have the hearings just as soon as we can after January 1.

Senator JOHNSON. I thank the Senator from Mississippi and the Senator from Missouri and the Senator from Connecticut for their observations on the Cordiner report.

As I have stated earlier, that subcommittee will no doubt take action early in January, and any and everyone who desires to be heard will be afforded that opportunity I am sure.

I express the hope expressed by the Senator from Mississippi that the Secretary of the Air Force, who has a tremendous responsibility in connection with his large personnel, will fully inform himself of all the provisions of the report; and then when he comes to testify before that committee, he will be able to testify in favor of all that part of the bill which he embraces. I think it is a very important recommendation made to Congress.

I have no doubt but what we ought to accept a substantial part of it, reject other parts of it, perhaps postpone others, but in any event I think it is good that we can express ourselves on this subject this morning. We have been able to do so and still recess at 1 o'clock. Are there any other questions of the Secretary or of General White? I will be glad for any member to speak up.

Secretary DOUGLAS. Senator, may I make two brief statements?

Senator JOHNSON. Fine. I want to get the Senators clear now, Mr. Secretary, because you are liable to get them reactivated.

Have any other Senators any questions? If not, then we will be glad to hear from Secretary Douglas.

Secretary DOUGLAS. I just wanted to amplify or make clear my answer to Senator Symington with regard to instructions having gone to Convair to accelerate and increase the Atlas program.

General Schriever tells me that he gave Convair such instructions orally. I find that our written instructions to General Schriever were given on December 13.

I also think it is proper to say to the committee that a news release is just being made saying that Atlas was fired successfully at 12:38 p. m. So far as we know, it was a successful flight.

Senator JOHNSON. That is mighty good news. I am glad to hear it.

General White, do you have a statement you would like to make?

General WHITE. Nothing more, sir. Thank you very much.

Senator JOHNSON. We want to thank you gentlemen for your frank and candid approach to our problem.

We appreciate the service you are rendering. We realize the responsibilities and burdens you carry. We understand them and sympathize with you on them.

We want to be constructive and helpful wherever possible. We can only do so by getting guidance and suggestions from you who carry these responsibilities.

We thank you for coming here, and no doubt will see you again when we come back in January. I would like to say for the information of the public and the press that we will recess our session until 2:15, at which time we will hear from that great airman, Gen. Curtis LeMay. The committee is recessed until 2:15.

(Whereupon, at 1 p. m., the subcommittee recessed to reconvene at 2:15 p. m., of the same day.)

AFTERNOON SESSION

Present: Senators Johnson (Texas), presiding, Kefauver, Stennis, Symington, Bridges, Saltonstall, and Flanders.

Also present: Senators Bush, Barrett, Smith of New Jersey, Hickel, Dwyer, and Carroll of Colorado.

Senator JOHNSON. The committee will come to order.

Before resuming the hearings, I think it is in order to comment on the reported successful launching of the Atlas by the Air Force.

According to the UP ticker, the missile was launched successfully at Cape Canaveral at 12:38 p. m. It flew a prescribed course of several hundred miles and landed in what was described as a pre-selected impact area.

The Chair desires to express the thought that he hopes this is the forerunner of a period of achievement. Our country needs action and there should be no gap between promises and performance. Certainly the committee is going to ask that we be filled in on the details of this firing in executive session at the earliest possible date.

Our first witness this afternoon is Gen. Curtis E. LeMay. America has no more distinguished airman than General LeMay, who is now vice chief of staff of our Air Force.

General LeMay trained the first group of B-17 bombers to go to England in the fall of 1942. He introduced formation pattern bombing.

With the Eighth Air Force he made combat flying history in World War II. Later in the war he headed the 20th bombing command in the Chinese-Burma-India field.

He has faithfully served as chief of staff of the United States Army Strategic Air Force.

After the war he was appointed Deputy Chief of Air Staff for Research and Development.

In 1947 he became commanding general of the United States Air Forces in Europe. The following year he assumed command of the Strategic Air Command. He was reassigned to Air Force Headquarters last July, became vice chief of staff.

I have known General LeMay as an officer and a person for some time. There is no one in whom I have greater confidence or a higher respect of than General LeMay, and I am very glad that I live in a country whose uniform you wear, and whom you serve.

Raise your right hand, please.

Do you solemnly swear that the testimony you give this committee will be the whole truth and nothing but the truth?

General LeMay. I do.

(The biographical sketch of General LeMay follows:)

General LeMay is vice chief of staff for the United States Air Force.

He was born in Columbus, Ohio on November 15, 1906. He was graduated from Ohio State University with a bachelor of engineering degree in June 1928. The following October he was appointed a second lieutenant in the Regular Army, after completing flight training at Kelly Field, Tex.

From his first tour of duty with the 27th Pursuit Squadron at Selfridge Field, Mich., until just prior to the United States entry into World War II, General LeMay had many important assignments.

General LeMay trained the 305th Bombardment Group, which he took to England in the fall of 1942. He introduced formation pattern bombing.

From June 1943 to June 1944, General LeMay was commanding general of the Third Bombardment Division, Eighth Air Force. In August 1943 he led the famous shuttle mission of Flying Fortresses from England to Africa, the first such made (Target: Regensburg, Germany.)

He was transferred in August 1944 to the China-Burma-India theater to head the 20th Bomber Command.

General LeMay was appointed commander of the 21st Bomber Command in January 1945. When this command was changed to the 20th Air Force, he continued to head it until he was assigned as Chief of Staff of the United States Army Strategic Air Forces.

In October 1945 General LeMay was assigned to Air Materiel Command Headquarters at Wright-Patterson Field, Ohio, where he remained until December 5, 1945, when he was appointed Deputy Chief of Air Staff for Research and Development at Air Force Headquarters in Washington, D. C.

General LeMay, on October 1, 1947, was named commanding general of the United States Air Forces in Europe. In October 1948 he assumed command of Strategic Air Command at Andrews Air Force Base, Md., and the following month moved with SAC Headquarters to Offutt Air Force Base, Nebr., retaining his position as commanding general.

Reassigned on July 1, 1957, General LeMay went to Air Force Headquarters, Washington, D. C., where he became vice chief of staff for the Air Force.

General LeMay has received numerous decorations including the Distinguished Service Cross, Distinguished Service Medal with two oak leaf clusters, Silver Star, and the Distinguished Flying Cross with one oak leaf cluster.

Senator JOHNSON. General LeMay, do you have a prepared statement?

General LEMAY. No, sir; I do not.

Senator JOHNSON. I guess this is the same old story with you.

You have been up here as far back as I can remember trying to awaken and arouse the American people and give us your views on the state of our Nation's preparedness. We welcome you back with us. We know that you will be frank and candid while trying to be diplomatic.

I hope the counsel will probe rather deeply and that we will get to your innermost thoughts because I do not think there is ever a time when words of advice from you to the Congress or the American people is more needed or will be more worthwhile.

Counsel, will you proceed with the examination?

TESTIMONY OF GEN. CURTIS E. LEMAY, VICE CHAIRMAN OF STAFF FOR THE UNITED STATES AIR FORCE

Mr. WEISL. General LeMay, as Senator Johnson has pointed out, just as Dr. Teller is known as the father of the hydrogen bomb, you are known to the country and to the world as the father of the Strategic Air Command.

I would like to start out by asking you this question, General LeMay.

Do you believe that our manned bombers with nuclear weapons today constitute the major military deterrent against Soviet aggression and our major weapons system of retaliation?

General LEMAY. I don't think there is any doubt about that, counsel.

That is true.

Mr. WEISL. How long have we got to keep that strength?

General LEMAY. It is rather difficult to pick out a definite date when we could absolutely say that unmanned vehicles or weapons systems would take over the mission now performed by the manned vehicle.

I expect it to be a gradual transition, and I have serious doubts whether we will ever see the time when there will be no unmanned vehicles in our weapons inventory.

I believe that there will always be a place for them, and while they may not look like the airplanes that we now operate, they will be manned weapons systems nevertheless, and I think any force that has manned weapons systems at its disposal will certainly have the advantage over one that chose to go to an unmanned system.

Mr. WEISL. General LeMay, as Senator Johnson pointed out, you have testified and retestified. You have stated to the Subcommittee on Airpower or the Armed Services Committee that you need a greater dispersal of SAC bases.

Has anything resulted from that testimony?

General LEMAY. Since I last appeared before the committee, I believe there has been one more base assigned to the Strategic Air Command.

However, it is only capable of taking tankers at the present time and needs some more construction before bombers can move on it.

Mr. WEISL. General LeMay, how many bases do you need to discharge the responsibility of keeping this Nation reasonably secure?

General LEMAY. That is a matter of judgment, and your opinion must be rendered after taking into account the threat that possible enemies have at the time you are considering.

I would say that in the past we have recommended a program of at least having only 1 squadron of B-52's on a base and only 1 wing of B-47's on a base, as a minimum program, and as the threat increases it may well be that you should go farther than that.

Mr. WEISL. How many do you have now on a base?

General LEMAY. We have 2 wings of B-47's on most of the bases and 1 wing of B-52's on most of the bases.

Mr. WEISL. And what do you recommend that we now do, General LeMay?

General LEMAY. I recommend we implement this dispersal program, the minimum program that we have been recommending for some time to go to no more than 1 squadron of B-52's on each base and no more than 1 wing of B-47's.

Mr. WEISL. Have you any idea as to why this has not been accomplished, in view of your very serious testimony time and time again? Who is to blame?

General LEMAY. Well, I think many people are to blame. I think the Department of Defense is to blame for not pressing more strongly for that program.

I think the Congress is to blame for not appropriating the money to build these additional bases, and probably the administration for not pressing the Congress more strongly.

Mr. WEISL. Has Congress been asked to do this by the Defense Department.

General LEMAY. I don't believe the full program has ever been presented to Congress; no, sir.

Senator JOHNSON. General, have you ever found a way for Congress to make the executive spend money it does not want to spend?

General LEMAY. No, sir, I don't believe it is possible.

Senator JOHNSON. Then why is it fair to blame the Congress for not forcing the executive to spend money that the executive does not want to spend?

General LEMAY. I do not believe that this particular money has been appropriated and the executive had a chance to spend it.

Senator JOHNSON. But in view of the \$400 million which was appropriated and which the executive impounded, and the \$900 million appropriated which they refused to spend, there is no more reason to believe that they would spend money for this program than there was to believe that they would spend appropriated moneys for other programs they did not ask for. We appropriated the money and they just locked it up; is that not right?

General LEMAY. That is correct, sir.

Senator JOHNSON. Then is it not a little unfair to say Congress is to blame? If Congress had been asked to do this by the executive, and if we had considered it and refused to do so then we would be entitled to be blamed. But it seems to me that you can take a horse to water but you cannot make him drink. You can appropriate funds to the executive but you cannot make him spend it. The two times we have appropriated additional money in substantial amounts to the Air Force, both times the executive refused to spend it; is that correct?

General LEMAY. I quite agree with you, sir.

Senator JOHNSON. Thank you. Mr. Counsel.

Mr. WEISL. General LeMay, about 2 years ago at the airpower hearings, to wit: April 1956, you testified that the B-36 was no longer modern, but might be useful for another year or so if we could employ it under circumstances which we select. Now, do we still have as many wings of B-36's as we do of B-32's in operation today?

General LEMAY. Yes; we do.

Mr. WEISL. I mean B-52's.

General LEMAY. We do.

Mr. WEISL. You also testified that the B-36 must be replaced as rapidly as possible. Has this been done?

General LEMAY. It has been replaced as fast as the B-52's have come off the production line. I think we have the capability of producing B-52's at a more rapid rate than we have produced them.

Mr. WEISL. Why have we not produced B-52's at a more rapid rate, if you know, General LeMay?

General LEMAY. The Department of Defense has not recommended a more rapid buildup in the heavy force.

Mr. WEISL. Have you any idea why they failed to make this recommendation?

General LEMAY. I do not.

Mr. WEISL. You have recommended to the Department of Defense that they do so time and time again; have you not?

General LEMAY. Yes, sir.

Mr. WEISL. You testified also before the Airpower Committee that the more planes we have and the more bases available on which to disperse these planes, the greater the chance of absorbing any initial attack and in turn having enough left to destroy the enemy by means of a counterblow. Do you still stand by that testimony?

General LEMAY. I do.

Mr. WEISL. And despite the fact that you have time and time again stated under oath that the Nation to be secure must have dispersal of these bases and must have more B-52's and must replace more B-36's, that mission has not as yet today been accomplished?

General LEMAY. It has not been accomplished; no. However, I know of several plans that are now in progress, that will ease the situation somewhat. However, I know of no complete plan that will fill the minimum dispersal that we have recommended.

MINIMUM DISPERSAL IMPERATIVE

Mr. WEISL. And unless we have that minimum dispersal, you will not take the responsibility for saying that this Nation is safe against attack?

General LEMAY. In my judgment, that minimum dispersal is absolutely necessary.

Mr. WEISL. And even the present plans that you speak of do not take that minimum dispersal as a basis for a start-off?

General LEMAY. The present plans will disperse all of the B-52's but it will not disperse to one-wing stations all the B-47's.

Mr. WEISL. You recommended the B-47's also be replaced, do you not?

General LEMAY. Yes.

Mr. WEISL. General LeMay, do you have sufficient funds to give flying time in sufficient hours to protect your flyers?

General LEMAY. No, sir. For the past several years we have not been able to fly our crews as much as I consider necessary to give them proper training. We have always fallen short.

Mr. WEISL. Why have we fallen short?

General LEMAY. There are two main reasons. One, lack of maintenance and operations funds to produce the necessary flying hours; and, two, lack of skilled people to actually generate the necessary maintenance to produce those flying hours in the units.

Mr. WEISL. Why do we lack crews to produce the necessary maintenance to keep those units flying?

General LEMAY. We have in the past several years been short of people. In the Strategic Air Command we have enjoyed a priority that other units in the Air Force have not enjoyed, so we have been closer to having a proper number of people than other units. But with the skill level of the individuals that we have been able to attract and retain in the service and the numbers, we could not do the necessary maintenance work to fly our airplanes as much as you would like to.

Mr. WEISL. Is it not necessary to have the proper minimum maintenance for a proper minimum standard of safety for those planes?

General LEMAY. That is correct.

Mr. WEISL. Have you sufficient manpower to do that even?

General LEMAY. I think we could do better if we had higher skilled people. We have minimum standards of maintenance for flying safety reasons, yes. But with the skilled people we have, we are always subject to human error, and I believe that our accident rate is higher than it would be if we had a higher skill level in the force.

Senator JOHNSON. Counsel, could we get him to elaborate a little bit? He just told me a very interesting story about the experience of the average fellow in the Air Force, the man who has been there a limited length of time. Would you discuss the limited skills and experience you have had to operate with in the Strategic Air Command?

General LEMAY. Well, at the present time or at the time I left the Strategic Air Command on the 1st of July some, oh, nearly 80 percent of them that had been with us for less than 4 years, and—

Senator JOHNSON. Wait a minute, Mr. Counsel.

What you are saying is that only 1 out of every 5 persons in the Strategic Air Command had been with you as long as 4 years?

General LEMAY. Yes, sir.

Mr. WEISL. Why is that, General LeMay?

General LEMAY. That is the best we could do with the reenlistment rate we have in the Air Force.

Mr. WEISL. How do you account for the reenlistment rate being that low?

General LEMAY. People are not attracted to military service.

Mr. WEISL. Why are they not attracted to military service? Is it because of pay, living conditions, or other incentives? Please elaborate.

IT ALL BOILS DOWN TO PAY

General LEMAY. I think it is mostly pay, and there are many other reasons, of course. You get many answers to the question when you survey your people, and we have made many such, but it all boils down to compensation. The compensation that has been offered to people in the military service has not been what they can obtain in civilian life, and they have chosen civilian life.

Mr. WEISL. In order to get your planes off the ground, General LeMay, how much warning do you need?

General LEMAY. It depends on the degree of preparation you have made, and the facilities you have to get off quickly.

Mr. WEISL. Well, with the preparation and facilities that you now have, how much warning do you need?

General LEMAY. Do you mean all of the airplanes or 20 percent or a substantial quantity?

Mr. WEISL. Well, you tell us how much you can get off and what warning time you need.

General LEMAY. All right, sir.

If you can establish a position of alert such as we have recommended for the last several years, whereby you can maintain a substantial portion of your force ready to go, with the airplanes gassed, bombed, inspected, and ready to leave the ground, and the crews nearby, briefed on their mission, and ready to go, and if you have the proper facilities, if you have the crews nearby, the communications nearby, we feel that you can get about a third of the force in the air in 15 minutes, provided you are dispersed on enough airdromes. Large airplanes require 1-minute takeoff interval on single runways.

To do that you need more than 1 crew of airmen. You need about 1.6 crews per airplane. Even with that ratio, the crews are going to be working about 70 hours a week.

Now, we have run service tests on this system, and it works very well. The crews seem to be able to take that sort of a schedule without minding it too much.

While they work 70 hours a week, we can arrange their schedules so that they have a little more consecutive time off than they have now; they are certainly not on a 40-hour week now.

If you do not have those facilities, the crews necessary, then you are forced into something less than that in the way of performance in case you are given the word to go.

Let us go right back to the position we were in several years ago where we had less than 1 crew per airplane. Part of them were not combat-ready; most of them lived off the base, some of them 40 and 50 miles away. So when you gave the word to go then, you had to get your airplanes ready, get the bombs on board, get the crews assembled, brief them on the mission, and send them off, and it has varied from base to base, but it took a period of several hours.

As we grew more proficient, we were able to maintain a portion of our better-trained crews on a semialert status, where we knew where they were, either on duty or in their homes or close to the base, and we could have an airplane ready to go, earmarked for that purpose, withheld from training, and we could get the airplanes off or a portion of them off in a relatively short time. We have been under that system for some time.

What we actually need is a 15-minute alert for the future, and time is growing short when we must be in that state.

In order to get it, we must have additional facilities on the base. We must disperse force so you don't need to take a great number of airplanes off 1 base, because if we only have 15 minutes, and you have 15 airplanes on the base you want to get off, that means that you have to get them off 1 a minute or less, usually less, because it takes some time to get the crew in the airplane from the time you ring the bell, so you can see that you cannot get 2 wings of airplanes off 1 base in 15 minutes at the rate of 1 a minute.

In addition to the facilities that you must have, you are going to have to produce some more flying time.

Right now, with the technical skill that we have, we are just barely keeping solvent. We are not producing enough flying time for all of the crews at one crew per airplane, all that we would like to have.

If you had more crews to a wing, you have to produce more flying hours to give them the proper training, and you have to do it with less airplanes, because you have some of them sitting on the end of the runway ready to go. This means more efficiency in your maintenance organization. You must have better skilled people to do it.

Mr. WEISL. Are you through with that?

General LEMAY. I think I have touched on most of it.

FIFTEEN-MINUTE WARNING OF ICBM

Mr. WEISL. General LeMay, you have stated, if we had certain conditions existing, a 15-minute alert would be the minimum. But we do not have those conditions today; do we?

General LEMAY. I used the 15-minute warning time, that being the time given to us by our scientific advisers, as the time that we will probably have in case intercontinental missiles are coming.

Mr. WEISL. I know that is what we probably will have, but I would like to know what we do have today, since SAC is the only force in being we have today to retaliate against a possible attack. What do we have today? Do we have any alert system to alert us against an intercontinental ballistic missile?

General LEMAY. We have some small capability, with experimental equipment which, I think, General White mentioned this morning, the classification of which is such that I would not want to describe it any more in open hearing.

Senator JOHNSON. Could I ask a question at this point? How much of SAC could you put in the air on a 15-minute alert?

General LEMAY. I wouldn't want to quote numbers in an open hearing.

Senator JOHNSON. Ten percent?

General LEMAY. I would rather refer you to this discussion on the alert that I have just given and say that we haven't received much in the way of facilities or completely trained our extra crews up to the point where we can move very far along the path we must go to achieve this goal of one-third of the force on the alert.

Senator JOHNSON. Thank you, counsel.

Mr. WEISL. Well, you have not been able to maintain the condition of alert that you recommended, have you?

General LEMAY. No, sir; we have not.

Mr. WEISL. And, today, isn't it a fact that, while you have some experimental system, you really cannot depend on that system to give you an alert against the coming of an intercontinental ballistic missile, can you, General LeMay?

General LEMAY. If intercontinental ballistic missiles were fired at us today, I don't think we could detect them.

Senator SALTONSTALL. What was that? Would you repeat that?

General LEMAY. I say, if a number of intercontinental missiles were fired today, I don't think we would be able to detect them.

Mr. WEISL. In 1956, General LeMay, you testified that a strong attack would probably destroy most of our bases in the United States. Does this testimony still stand today?

General LEMAY. Yes; I think so.

Mr. WEISL. What can we do to protect ourselves against that sort of a tragic eventuality?

General LEMAY. Your best defense is to prevent the attack from ever starting.

Mr. WEISL. How can we do that?

General LEMAY. By providing a deterrent force that will guarantee a war never starting.

Mr. WEISL. But you do not have that force today, do you, General LeMay?

LESS CONFIDENT NOW THAN IN APRIL 1956

General LEMAY. I think we have it today. Certainly, we are not at war today; that is the strong point in favor of our deterrent force being effective, and, if we did go to war today, I think we would probably win it. However, I say that with less confidence than I said it in April 1956.

Mr. WEISL. I did not hear the last sentence, General LeMay.

General LEMAY. I said that, if we did go to war, I think we would probably win it, but I say that with less confidence than I said the same thing in April 1956.

Mr. WEISL. Would you have any warning system at all today if Russia released ballistic missiles against us?

General LEMAY. No effective warning system; no. We might detect one of them, but it probably would be accidental rather than by design.

Mr. WEISL. If it is only accidental, you would not have much chance of winning a war if they released a lot of intercontinental ballistic missiles against us, and we wouldn't get enough warning to get off the ground, would we?

General LEMAY. I don't think that Russia has enough ballistic missiles to launch today to prevent SAC from getting off the ground, nor do I think they will have it for some time.

Mr. WEISL. But isn't it best to assume that they might in the near future have enough of them, and shouldn't the United States base its preparation on that assumption, rather than try to underestimate what they have?

General LEMAY. That would certainly be a safer procedure.

Mr. WEISL. In other words, to get what we need against that eventuality, we must accept the recommendations that you have made, as to alert, as to the dispersal of bases, as to the supplying of more

adequately trained crews, as to better maintenance of your engines and your electronics in the planes, and the other recommendations that you made; is that not a fact, General LeMay?

General LEMAY. That is true. I think the margin of power that we have enjoyed in the past over our potential enemies is shrinking very rapidly, and it certainly behooves us to use whatever we have in the most efficient manner possible before we start applying any more or strengthening our defenses by other means. We have not done that yet, to my satisfaction, at least.

Mr. WEISL. Don't you think, General LeMay, unless the things that you and the Air Force have recommended with reference to SAC are done, the American people may be living under a false illusion?

General LEMAY. I agree with you on that.

Mr. WEISL. Shouldn't we put the facts on the line and say to the people unless they do these things they won't even have the retaliatory deterrent that SAC now gives them?

General LEMAY. I have done so before, and I am trying to do that now.

Mr. WEISL. I am sure you are, General LeMay. You have always done it. I don't blame you for being discouraged, but I think we are living in a climate today, after sputnik, that maybe the people will listen and get something done along the lines that you have so urgently recommended. Have you any other suggestions to make to this committee that would help make SAC, which is the major deterrent force we have in being, a real deterrent against an attack by the Russians?

General LEMAY. I have mentioned the most important things, I think. I would like to make one statement, however, in this atmosphere of sputniks and intercontinental missiles, when accusations and denials seem to be flying around the atmosphere of today, and that is I don't think any of us should be panicked by the fact that, apparently, our potential enemy is ahead of us in an armament race, or at least a portion of it.

I still think there is time to catch up. The thing I am worried about is how we are doing today. I worry about that, first. I will worry about that tomorrow after we have taken care of today. Our main deterrent power today is a manned bomber and a nuclear-weapons system. It is going to be our main deterrent and our main protection for some time.

How fast missiles are brought into the inventory depends on a lot of things. We don't know too much about them yet. We certainly want to find out as fast as we can. But we have to look to our manned force and make sure we are using that as efficiently as possible, and make sure we are modernizing it adequately. I don't think we are doing that.

Now, I sit over there in the Air Staff and try to make plans for as many years in advance as we can. Granted when you start thinking about appropriations 3, 4, 5, 6, 7, or 8 years from now, you are a little bit out in the blue. We all know that atmosphere changes. We can't predict what any particular Congress is going to do, but we try to do the best we can.

In any plan that I have ever seen using reasonable assumptions of that sort, we are still going to be flying B-47's around in 1970.

I don't think that is an adequate rate of modernization for your manned force. I think we must go on with our missile program. But not to the detriment of today's force in being.

No one wants missiles any more than the people that are now flying the manned bombers, because they are the ones that are going to have to go over and do the job. Most of them have been over through the mill before. I don't think any of them enjoyed the process. I know I didn't.

If there is some way of carrying out their mission without getting shot at, they are certainly the ones that are primarily interested in getting it done. We want these missile systems as fast as we can get them, but we don't want them until we are sure they are better than what we have. We have to go on with the program, get some of them into inventory, get to using them, find out what they will do, find out how reliable they are, and then when we are convinced that they are going to be better than what we have, let them replace part of the manned force.

Mr. WEISL. General LeMay, certainly if the present plans we have mean that we will still be operating B-47's in 1970, that certainly isn't a very encouraging picture to protect the United States with; is it?

General LEMAY. Not encouraging to me.

Mr. WEISL. May I ask you this question? How many SAC planes are constantly in the air, I mean what percentage?

General LEMAY. I would say about 12 percent on the average day in and day out.

Mr. WEISL. Has that percentage increased or decreased over the past 3 years?

General LEMAY. I think it has probably decreased to some extent.

Mr. WEISL. Has there been an actual cutback in B-52 production since you gave your warnings to the people in your testimony over the years?

General LEMAY. Yes; I think we were up to a higher rate, and we have stabilized on it for a short rate of time.

Mr. WEISL. Since sputnik has that cutback in B-52's been restored?

General LEMAY. Not to my knowledge.

Senator SALTONSTALL. May I ask that that last question be repeated please?

Senator JOHNSON. Repeat the question, Counsel.

Mr. WEISL. Since sputnik has that cut back in B-52 production been restored?

General LEMAY. Not to my knowledge.

Mr. WEISL. Has the spending or the allotment of funds for maintenance and for flying time been cut back since you have testified over the years?

General LEMAY. Yes; we had a reduction of expenditures in the 1958 fiscal year.

Mr. WEISL. Has that been restored?

General LEMAY. It has not.

Mr. WEISL. Even since sputnik?

General LEMAY. No.

Mr. WEISL. I believe, Mr. Chairman, my time is up. I would like to ask one more question. Is there anything you would like to say that hasn't been covered by my questions?

General LEMAY. I think you have covered the main points.

Mr. WEISL. Thank you, Mr. Chairman, that is all.

Senator JOHNSON. General LeMay, why in your judgment have we fallen behind the Russians in air-striking power? I refer to both missiles and planes.

General LEMAY. I don't think we are behind them in air-striking power at the present time.

Senator JOHNSON. When do you think we will be behind them as you see it now, if our plans are not changed?

General LEMAY. I testified when I was up here last that I thought that time period would probably be about the middle of 1959. There has been some changes in our intelligence estimate back and forth, but no substantial change.

Perhaps they have come forward a little faster in missiles than we thought, and have not come forward as rapidly in manned aircraft as we thought, but I don't see any substantial change, and I would say that is still a pretty good date.

Senator JOHNSON. What do you think we can do 1, 2, 3, to maintain continued superiority?

General LEMAY. The first thing we are going to have to do is speed up all of our programs that I have been talking about.

One, I would do something about the people first. Let's get operating the hardware we have in a most efficient manner. We can't do it unless we have better people.

Senator JOHNSON. You are talking about the Cordiner report?

General LEMAY. That or something similar to it, pay them enough to attract them into the service.

The Cordiner bill is a good start. I never have believed that the proposals in the Cordiner bill would do the job, but the method of going about it is so attractive that I am for it a thousand percent to give it a try, but I don't think the compensation figures mentioned in the Cordiner report will produce an adequate reenlistment rate.

Senator JOHNSON. That is what you are talking about, No. 1 is get better people. That is the first step.

General LEMAY. Better people.

Senator JOHNSON. All right, No. 2.

General LEMAY. Two, do something about the base situation so that we can operate the hardware we have in a more efficient manner than we are operating it now.

Senator JOHNSON. Did you say "base"?

General LEMAY. Base situation, dispersal and alert facilities, and things of that sort.

Senator JOHNSON. Now are you going to get the Defense Department to send us some recommendations along that line this year?

General LEMAY. I hope I have better luck than I have had in the past, Senator.

Senator JOHNSON. Did you hear the testimony of General White this morning?

General LEMAY. Yes, sir.

Senator JOHNSON. Did that not indicate that the Department of the Air Force was going to give you some relief, or at least recommend some relief for you?

General LEMAY. I stated a moment ago that I did not know of any plan in existence that would produce all the dispersal that I consider necessary as a minimum start. It is not in any plan that I know.

Senator JOHNSON. All right, that is two things. Go ahead.

General LEMAY. Do something about modernization. We are not modernizing the force that we are depending on today to keep us out of trouble, not doing it fast enough.

I think that the proposals that are in the mill on increasing the missile program are ample for the time being, maybe a little bit strong. I would say if we didn't do any of these other things, we are spending too great a percentage of our allotted resources on something for the future rather than taking care of today.

I think we are a little heavy on the missile side. But granted that we do something about these other three things, then I think the missile program that is in the mill is adequate to do the job.

Senator JOHNSON. That is four things—people, bases, modernization, and missiles as presently in the mill.

General LEMAY. A larger research and development program on future weapons systems.

Senator JOHNSON. Do you know what the plans for the Department of the Air Force are for next year as recommended to the Department of Defense?

General LEMAY. I am not so sure that I know all the details of it, no, sir.

Senator JOHNSON. You are Vice Chief of Staff. If you don't know, how do we find out?

General LEMAY. I think I can find out. However, plans change very rapidly in the Pentagon, and I am not so sure that I am right up to date all the time.

Senator JOHNSON. Have you had any indications there have been rapid changes lately?

General LEMAY. Not within the last week?

Senator JOHNSON. Last month?

General LEMAY. The last month, yes.

Senator JOHNSON. Good, good.

Now I want you to think this one over, General. Do you believe if we start now, that we can get the people, the bases, the modernization, and the missiles and the other things we need in time?

IT MAY BE TOO LATE

General LEMAY. No, sir, I think we are starting a little late. I would not guarantee we would get it in time.

Senator JOHNSON. So you think we had better get on our horse and get on in a hurry. Is that what you are saying?

General LEMAY. And even then it may be too late.

Senator JOHNSON. Are you satisfied with the present plans to build the ICBM early warning system, or should we be building it faster?

General LEMAY. I don't think we can move out any faster than we are moving at the present time. This is a very complicated problem, and there is certainly no general agreement of what we should do about it, what path should we take.

I think we have to go on with all the effort and study we can make on the subject, but I don't think we can go toward any particular system at the present time.

Senator JOHNSON. General, are the SAC planes in the air armed with bombs at this moment?

General LEMAY. Some of them undoubtedly are.

Senator JOHNSON. In the event of war, just how tough are we going to be?

General LEMAY. I did not understand that.

Senator JOHNSON. In the event of war, just how tough would we be in your opinion?

General LEMAY. Will you amplify that? What do you mean "how tough will we be"?

Senator JOHNSON. What would we do if the whistle was blown now, in your opinion? What would we rely on?

General LEMAY. We are going to rely on the Strategic Air Command almost 100 percent.

Senator JOHNSON. Have you any further suggestions that you would like to make to this committee as to what we especially need to do right now, today, to bring our SAC force up to optimum posture, other than what you have already told the committee?

General LEMAY. I would recommend a reorganization of the Defense Department in some manner, particularly in the Joint Chiefs of Staff. I do not have a definite recommendation how to do it. The only thing I know is, what we have should be improved upon.

The only suggestion I could make would be to give the Chairman of the Joint Chiefs of Staff more authority and more power than he has now, make him at least a voting member, preferably a member that can force agreement in the Joint Chiefs of Staff, and if he does not get agreement, give a military solution to the problem himself, to the Secretary.

Senator JOHNSON. Could we reach the principal Soviet cities today through SAC?

General LEMAY. Through SAC? Yes.

Senator JOHNSON. Thank you, General LeMay. I appreciate your testimony. I do not want to take any more time.

The general counsel has just handed me this question: In the air-power hearings, you testified:

We believe in the future the situation will remain the same as it has in the past, and that is a bomber force well equipped, determined, well trained, will penetrate any defense system than can be devised.

General, do you still stand by that testimony, particularly in view of our knowledge regarding the Soviet Union's modern defense system?

General LEMAY. I still believe it.

Senator JOHNSON. Thank you, General.

First, the chairman wants to welcome some of our distinguished colleagues here: Senator Smith from New Jersey and Senator Dworshak from Idaho. After the committee has made its rounds and concluded its questions, we will be delighted to have you propound any questions to the distinguished witnesses that you may desire. We are honored to have you present, and we are glad you are interested enough to come and be with us.

Senator Saltonstall?

Senator SALTONSTALL. Thank you, Mr. Chairman. I will be very brief.

General LeMay, I listened to you at length a year and a half ago, and I have listened to you here today, and your testimony has been perfectly consistent, in my opinion, with what you said then.

I just say this: It was your job then, as chief of the SAC, to make SAC as ready as it can be. As Deputy Chief of Staff today, you still have that responsibility, and I assume you also have some responsibility for the defensive tactical force. Am I correct in that?

General LEMAY. I am a staff officer now, Senator. General White has that responsibility; and my responsibility is to assist him in carrying out his duties. I have no direct responsibility.

Senator SALTONSTALL. Your duties are to keep our defense powers in SAC and in all other branches of the Air Force just as ready and just as up to date as you possibly can. You are interested in the present as a deterrent power.

General LEMAY. True.

Senator SALTONSTALL. And you are going to make that just as strong as you can.

General LEMAY. True.

Senator SALTONSTALL. And you believe that our present strength is mighty essential when we are considering all these forward-looking weapons?

General LEMAY. I am not so sure I understood the last part, Senator.

Senator SALTONSTALL. I did not make that as clear as I would like to have.

What I am trying to say is that we can look forward to these new weapons, prepare them in research and development and operational stages, but it is essential that we keep our present force just as strong as we can.

General LEMAY. That is true; yes, sir.

Senator SALTONSTALL. And that is your job, and you are going to do it to the best of your ability.

General LEMAY. Yes, sir.

Senator SALTONSTALL. Thank you, Mr. Chairman.

Senator JOHNSON. Senator Kefauver?

Senator KEFAUVER. Thank you, Mr. Chairman.

General LeMay, how many of our overseas airbases are under SAC command?

General LEMAY. I don't think we should give actual numbers. However, we have some overseas that are under SAC command; those that we intend to use predominantly are under SAC command. There are others that we are going to use that are not under SAC command.

Senator KEFAUVER. Well, are you thinking in terms of more bases in this country, or in other places?

General LEMAY. The bases I have been talking about have been those in this country.

Senator KEFAUVER. Does it give you any concern that some of our bases overseas might be within the reach of Soviet missiles?

General LEMAY. Not particularly. They have always been in range of an overpowering medium bomber force of the Soviets. We expect some of them to be attacked and destroyed.

Senator KEFAUVER. What progress is being made in securing cooperation with SAC and the Air Force of other countries, or do they work on different missions?

General LEMAY. Generally speaking, we work on different missions. However, SAC has been in very close contact with the theater commanders overseas. As a matter of fact, we have a segment of the SAC headquarters right alongside of General Norstad in the Atlantic, in Europe, and General Lemnitzer out in Japan when he was there, and now Admiral Stump in the Pacific, to help him carry out his responsibilities.

With that sort of an arrangement, we can cooperate very quickly and very effectively with the NATO setup. With individual countries, about the only planning to date with any other power for cooperation with SAC has been with Great Britain. They have the beginning of a long-range bomber force coming along, and we have worked very closely with them.

You have probably noticed in the newspapers that the Royal Air Force participated in the SAC bombing competition this past year. They have been doing that for some time now. They fell out for 3 or 4 years, but with the advent of new equipment that is moving into the RAF, they came back this year, and did very well.

Senator KEFAUVER. General LeMay, do you think of SAC as being a deterrent limited to small wars, to limited wars, or only to an all-out war?

General LEMAY. Well, I do not understand why a force that will deter a big war will not deter a small one, too, if we want it to and say it will.

Senator KEFAUVER. The general conception is that in a local war, you only use local deterrents; and SAC is not built on a local deterrent basis.

General LEMAY. I do not believe we can afford to maintain separate weapons systems for various types of arguments that we might get into with our neighbors in the world. I think we are going to have to build for the worst cases, and then use that for all others.

By that I do not mean that we have to unleash the full power of SAC for any and all occasions. We have weapons that cover a vast range of explosive force. You can use any one that you choose.

But I think that we have had a deterrent force in existence in SAC, because we have made it clear that we are going to use it in case we have to. We have been into some minor skirmishes because we did not make it clear that we would use our full power if necessary.

I think that a clarification along that line might be a little helpful, and then I think that a force that would deter a big war will deter a small one.

Senator KEFAUVER. You mean a smaller war or a war like we had in Korea, which was not a small war but one which turned out to be of considerable magnitude, that our position should be made clear as to what part SAC would have to play in the deterrent of aggression of that sort?

WARNING WOULD HAVE PREVENTED WAR

General LEMAY. I think that we could have prevented it by that means; yes, sir.

Senator KEFAUVER. Do you think our position is clear?

General LEMAY. I don't think it is clear to some of our own citizens, so it wouldn't surprise me to find that citizens of other nationalities didn't understand it.

Senator KEFAUVER. Is it clear to the Air Force, the Defense Department?

General LEMAY. I am not so sure it is; no. I think it could stand some clarification.

Senator KEFAUVER. Thank you.

Senator JOHNSON. Senator Bridges?

Senator BRIDGES. What are your current plans, General, for getting SAC enough men, planes, and bases in the very critical years of 1958, 1959, and possibly 1960, before we get into full missile operation?

General LEMAY. I don't think we ought to discuss those full plans in open session, Senator.

Senator BRIDGES. I understand.

General LEMAY. I will be glad to discuss it in detail in a closed session.

Senator BRIDGES. I think that is probably wise.

I have no further questions.

Senator JOHNSON. Senator Stennis?

Senator STENNIS. General LeMay, I certainly do not want to discuss any battle plans, but I would like to know what you think is the chief military threat now against us? From what source and what weapon or, what kind of attack do you think?

General LEMAY. The only attack that we should worry at all about is the nuclear attack of the Russian long-range air force.

Senator STENNIS. With what?

General LEMAY. With the Russian long-range air force.

Senator STENNIS. Long-range air force. What was it you said, that the only one that we should be——

General LEMAY. That is the only one that is a substantial threat to this country.

Senator STENNIS. One thing on this manpower question. You have been releasing some pilots, B-47 pilots, some of your Reserve officers, involuntarily releasing them, have you not?

General LEMAY. Yes, sir, that is true.

Senator STENNIS. How did that come about?

General LEMAY. It came about——

Senator STENNIS. You need more men, I know that, but how did that come about?

General LEMAY. It came about by a directive from the Department of Defense to reduce the manpower of the Air Force down to a certain figure at a certain time. We tried to release the least desirable people from all standpoints. In other words, we tried to maintain the most combat-capability possible under the manpower ceilings. But it meant releasing some people, and some very valuable people.

Senator STENNIS. I am not referring to any particular case. But you did have to release men there for the lack of funds or under a directive to reduce your personnel, and that included a considerable number of qualified B-47 pilots and other crew personnel; is that correct?

General LEMAY. Yes, sir. We released officer personnel by having a board go over the records of all of our people, and reduce or relieve

the least efficient, taking into account how critical that particular category of officer was to the Air Force as a whole. That took in some B-47 pilots.

Another thing we did was offer early release to those who chose to take it, of Reserve officers who had a termination date already.

I don't know what the full effect on SAC is going to be of both of those programs.

However, I was briefed the other day to the effect that if everyone chose to take an early release, that was eligible to take it, and plus the ones that were being relieved anyway the result might cost SAC as many as a thousand crews.

Senator STENNIS. Well now, in your plea here for stepping up your SAC operations, does that include a plea for more pilots?

General LEMAY. To build the crew ratio up to 1.6; yes, sir.

Senator STENNIS. And you do not have enough now to build it up to that point?

General LEMAY. We are up to about a little under 1.5 crews manpowerwise in SAC at the present time. However, those people are not yet combat-ready. We are only a little over one crew per airplane combat-ready.

Senator STENNIS. And your desired level is 1.6, and you are now at just 1 plus something; a little above 1?

General LEMAY. Yes.

Senator STENNIS. But at the same time you have been having to release these men who are already trained?

General LEMAY. That is true.

Senator STENNIS. I have heard a figure mentioned, perhaps by you, as to what investment you have in a B-47 pilot by the time he has reached that point.

Do you have in mind a figure on that as to how much it is?

General LEMAY. I remember a figure on B-47 crew as being some \$700,000 per crew. I don't remember a specific figure for a pilot. I will obtain one for that.

(An Air Force memorandum with appendixes titled "Investment in B-47 Pilot Personnel" follows:)

INVESTMENT IN B-47 PILOT PERSONNEL

The estimated Air Force investment cost of a B-47 combat-ready pilot totals \$653,180. This cost consists of \$245,770 for the training shown in appendix B (flying school and formal operational pilot training in SAC) plus \$407,410 for prerequisite flying within the combat organization as shown in appendix C (650 hours of copilot flying in the B-47). Investment costs include pay and allowances, pro rata share of direct aircraft operating costs, and pro rata share of base support, command overhead, depot maintenance and aircraft replacement costs. These items are explained in appendix A.

APPENDIX A

EXPLANATION OF ESTIMATE OF THE AIR FORCE INVESTMENT COST IN A B-47 COMBAT-READY PILOT

1. The costs are portrayed in two different categories, i. e., Flying Training Costs, Appendix "B" and prerequisite Flying Costs, Appendix "C." The appendixes are generally self-explanatory; however, pertinent additional information relative to costs of training fully qualified B-47 Aircraft Commanders is set forth in this exhibit.

2. Specified amounts of progressive flying experience are required before pilots enter the B-47 aircraft commander position. Such experience is com-

prised partly of what is termed "productive" flying and partly of what is considered "training". It is impossible to achieve a precise cost distinction between the two parts that make up the total time involved. The costs of this prerequisite flying experience are therefore shown separately in Appendix "C" since they should be recognized when considering total training costs for these aircraft yet do not exclusively represent training in a restricted sense.

3. In estimating the cost of a fully qualified, combat-ready B-47 aircraft commander, the criteria outlined below were used:

a. B-47 Aircraft Commander

(1) In order to become qualified as a combat-ready aircraft commander he must have completed 650 hours total flying time in B-47 aircraft as co-pilot and 100 hours additional flying time as first pilot. The present requirements for entry into the B-47 program have changed considerably from the old concept of 1,500 hours flying time in a 4-engine or more aircraft. The prime source of entry has been and will continue to be directly from Air Training Command graduates of the Advanced Medium Bombardment Course. It has been assumed that one-third of 650 hours of prerequisite co-pilot flying time and one-third of the 100 hours of the first pilot flying time is chargeable against the co-pilot selected for upgrade training (based upon a 3-man crew, each member benefiting equally from the flying hours). During the 100 hours of upgrade training for the B-47 Aircraft Commander the KC-97 refueler is required to fly 20 hours in support of the upgrade mission for practice airborne refueling of the B-47. This flying time is chargeable against the B-47 Aircraft Commander.

(2) The total cost of acquiring the prerequisite co-pilot and upgrade pilot experience in the B-47 is estimated to be \$470,145 (\$407,410 prerequisite co-pilot experience, and \$62,735 upgrade pilot experience). This cost covers the pay and allowances of the pilot for the period of time that he is actually acquiring the experience necessary to be upgraded to aircraft commander. In addition there is included the pro rata share of aircraft fuel, lube, base support, command overhead (SAC), depot maintenance and aircraft replacement costs. Base support costs include such costs as installation maintenance, medical care, administration, etc.

4. These estimates have been developed for planning and informational purposes only and are not suitable for budgetary purposes.

APPENDIX B

1. Estimated Costs of Training Fully Qualified Combat Pilots

Course name	Time Required (days)	Air Training Command Costs	Combat Command Costs	Depot Maintenance Costs	Aircraft Replacement Costs	Total Costs Attributable to Training
Aircraft Commander B-47						
Preflight	84	\$700				\$700
Primary Pilot Training	168	8,925		\$2,325	\$4,380	15,630
Basic M/E Training	154	18,760		3,955	4,135	26,850
Advanced M/E—Phase I Transition	56	10,085		9,965	31,520	51,570
Advanced M/E—Phase IV Special Weapons	21	3,185				3,185
Advanced M/E—Phase V Celestial Navigation	14	2,525				2,525
AOB School	168	4,410		1,000	545	5,955
Advanced Survival Training	21	1,280				1,280
Supervised Co-pilot (SAC)						
Judo Instruction (SAC)	20 hrs		\$6,015	1,565	4,965	12,545
B-47 Prerequisite Flying (SAC)						
Physical Education Program See Appendix "C" For Costs						
B-47 Combat Readiness (SAC)	17 hrs		15,035	3,995	12,665	31,695
Upgrade to B-47 Aircraft Comdr (SAC)	100 hrs		30,065	7,835	24,835	62,735
KC-97 Support (Refueling Training (SAC) for Aircraft Commander)	20 hrs		17,000	2,600	11,500	31,100
Totals		\$49,870	\$68,115	\$33,240	\$94,545	\$245,770

APPENDIX C

Estimated Costs of Prerequisite Flying

B-47 prerequisite flying (SAC) :

Duration-----	(hour)-----	650
Operating costs combat command-----		\$195, 435
Depot maintenance costs-----		50, 915
Aircraft replacement costs-----		161, 065
Total cost of prerequisite flying-----		407, 415

Senator STENNIS. How many were in the crew?

General LEMAY. Three.

Senator STENNIS. And you had an investment there of \$700,000 for the 3?

General LEMAY. Yes, sir.

Senator STENNIS. I believe that is all, Mr. Chairman. Thank you.

Senator JOHNSON. Senator Flanders?

Senator FLANDERS. Nothing at this time, Mr. Chairman.

Senator JOHNSON. Senator Symington?

Senator SYMINGTON. General, some of the questions I was going to ask you have already been asked by eminent counsel, who, obviously, has prepared himself very carefully for these hearings.

But let us sum up. After sputnik, all the reaction in this country from many in authority was that, even though we didn't have the missiles, we had the Strategic Air Force, about which you know more than any living man. Now, you are testifying to this committee that that Air Force has in it obsolescent and obsolete airplanes, that it hasn't enough people, and that it hasn't enough well-trained people; also, that the plans for correcting that situation are not adequate; is that a fair summation?

General LEMAY. That is an adequate summation; yes, sir.

Senator SYMINGTON. Despite all the talk, all the phony talk, that has been given the American people about the strength of the Strategic Air Force, it is a fact, is it not, that not too long ago, because of lack of money, there was not enough gasoline, and, as a result, the Strategic Air Force was grounded?

GROUNDED BECAUSE IT LACKED GASOLINE

General LEMAY. Yes, sir; that is correct. At the end of the last fiscal year, the majority of the Strategic Air Command was grounded for the last 5 weeks of the fiscal year because of lack of gasoline.

Senator SYMINGTON. Now, since 1946, when you were running research and development and telling me you were spending so much time reprogramming you couldn't do any research and development, since the days when you and I used to go up to Mr. Forrestal's for dinner and try to justify long-range bombers, you have been hammering to the American people over the years that unless they got strong they might find themselves where they were inferior to the possible enemy; is that correct?

General LEMAY. Yes, sir.

Senator SYMINGTON. In your testimony in the Air Power Subcommittee hearing of 1956, where, unfortunately, a disagreement among the committee members prevented the true impact of a unanimous report under counsel's questioning, you were asked:

General LeMay, is it not a fact that, unless there is a change in our present plans and programs, the Russian long-range air force will have greater striking power than SAC by the period 1958-60?

And your answer was:

Under the assumption stated in the question, the Soviets will enjoy a numerical advantage in long-range bombers in the period 1958-60.

There has been a change in the present plan and program. But the change has all been down, has it not?

General LeMay. In the Strategic Air Command; yes.

Senator SYMINGTON. I believe it was Mr. B. M. Baruch who said he felt this country could afford to spend as much to defend its freedoms as any other country could spend to destroy those freedoms. You would agree with that, would you not?

General LeMay. I think so.

Senator SYMINGTON. We hear that maybe defense expenditures should be a billion more, or 2 billion more—one of our colleagues has said it should be 20 billion more—but shouldn't we first find out what we honestly believe the Soviets have, on the basis of all intelligence; then find out what we believe we should have to be able to resist—to have adequate resistance, and then, reorganize the Defense Department so as to eliminate duplication and waste, in order to get adequate defense at minimum cost to the American people? Would that be a fair way to approach it?

General LeMay. It seems reasonable to me. However, there is one thing that you must remember. Finding out what the possible enemy has is not as easy as it sounds. You had better buy a little insurance on that factor.

Senator SYMINGTON. We have to do our best. You mentioned, in reply to questions, the sad conditions of personnel in SAC as against what you would like to have. Is it not true that, not too long ago, you presented your personnel situation to the president of one of the big airlines and asked him what he would do with conditions like that, and his answer was that he would never allow an airplane in his company to leave the ground?

General LeMay. Well, substantially that, sir. I did have occasion to discuss our personnel situation with not 1 but 2 of our airline presidents, and they agreed that with a personnel situation like that they could not operate their airline.

Senator SYMINGTON. In other words, this is the great defense we have against the menace of communism. This is the Strategic Air Force, where the experienced president of a great airline said if he had been reduced in funds to the point you have, he would not let a plane leave the ground, or words to that effect; is that right?

General LeMay. Substantially that; yes, sir.

Senator SYMINGTON. You intend to continue your work to get an adequate Strategic Air Force this year?

General LeMay. As long as I am in the service, I can do no less.

THE GAITHER REPORT

Senator SYMINGTON. Have you ever seen the Gaither report?

General LEMAY. Yes, sir; I have read portions of it.

Senator SYMINGTON. Are you impressed with it?

General LEMAY. I think it is a very good document; yes, sir. I don't know that I will agree with everything in it.

Senator SYMINGTON. Why do you think that the administration won't allow this committee to look at it?

General LEMAY. I have no idea on the subject.

Senator JOHNSON. If the Senator will permit me, I would like to make an observation here.

Senator SYMINGTON. I would be glad to yield to the chairman.

Senator JOHNSON. I do not know that the administration has yet reached such a decision.

Senator SYMINGTON. I stand corrected. I know the committee had requested the report and—

Senator JOHNSON. It has requested the report.

Senator SYMINGTON. I thought it had been refused.

Senator JOHNSON. It may be refused, but it has not been refused yet.

Senator SYMINGTON. I withdraw the question.

As I understand it, B-52 production was reduced in quantity, was it not? Now we are producing less than we actually produced some-time back; is that correct?

General LEMAY. I think that is correct; yes, sir.

Senator SYMINGTON. Since sputnik, despite the fact that is the plane you want, because in the B-36 you have the oldest combat air-plane in either our Air Force or the Russian air force, the B-36 originally designed before World War II, nevertheless, since sputnik there has been no increase in B-52 production, to the best of your knowledge?

General LEMAY. That is true; yes, sir.

Senator SYMINGTON. And you would know, as Vice Chief of Staff, if there had been a production increase, would you not?

General LEMAY. Yes, sir.

Senator SYMINGTON. There has been another witness here, who some believe about the greatest scientist in the world today, Dr. Teller. He said before this committee that we had just gotten ourselves in a position now, no matter how hard we tried, we could not but end up inferior to the Soviets.

Am I to understand your testimony today that you corroborate what Dr. Teller said?

General LEMAY. Well, I am not willing to concede defeat ever, Senator. I think we have waited pretty long before making a move. It is doubtful in my mind whether we could catch up before we have a general war. I hope we can, but I certainly want to try.

Senator SYMINGTON. I wanted to clear the record from that standpoint.

Would you say that unless we make a sharp change in our defense programs and policies, in a relatively short time, 1958 to 1960 were the figures you mentioned in 1956, our military position would be definitely inferior to that of the Communists?

General LEMAY. Yes; I believe that. Unless we do something, and something very radical, we are going to be in an inferior military position to Russia in a very short period of time.

The thing that bothers me is that while we have enjoyed a supposedly superior military position, we have not done too well in holding back communism. Even without a war, and in an inferior military position, we are going to lose ground very rapidly.

Senator JOHNSON. Senator Symington, will you yield to me for a moment on my own time?

Senator SYMINGTON. I would be glad to yield to you. Perhaps my time is over, anyway, but I would like to ask a couple more questions, if the committee will allow me.

Senator JOHNSON. In the airpower hearings, at page 214 you testified that in 1958, you expected the Soviets to be stronger in long-range airpower than we are.

Do you still entertain that view?

General LEMAY. I think it was the 1958 to 1960 period, and as near as we could come at that time, it was the middle of 1959, was a more accurate date of what we were thinking about at that particular time.

I do not see any reason to change that date much.

Senator JOHNSON. Thank you, Senator Symington.

Senator SYMINGTON. General, the sputnik, especially Sputnik II, gave to the American people a concept of Russian military progress, that they did not have before, and as a result, 90 percent of the people who come before this committee assure us that we are doing more in the missile field.

But everybody who has come before this committee, to the best of my knowledge, without exception, have stated we are not doing any more, even after sputnik, to improve our forces in being.

You and I both know it is going to be years before we have any operational ICBM's, truly operational, in any quantity that means anything.

I wish you would tell this committee, in your own words, if you believe it is right to pump up research and development on an unmanned weapon as against facing up to the problem of improving existing forces and giving us what is necessary to keep us free against communism.

General LEMAY. Well, Senator, I do not believe it is a great mistake to go on with these research and development programs.

Senator SYMINGTON. I did not mean that. I think you said in your testimony before that, you thought the ratios were being overbalanced, the emphasis was being overbalanced. I completely agree we should go ahead with research and development.

General LEMAY. I do not believe we should weaken our force in being today for a strength that may or may not materialize out in the future. We must maintain a constantly growing capability in our day-to-day forces to meet what we know is a constantly growing threat of a possible enemy.

If we have a dip in our daily combat capability, we are liable to find the enemy taking advantage of it. So we must maintain our current inbeing strength constantly, as well as carrying on these other very expensive programs that will produce us some combat potential out in the future sometime.

It is a very expensive procedure, but our national policy dictates that extra expense, because we are not an aggressive nation. We are only building for defense. We will only fight in case we are attacked.

Therefore, we must be ready for the attack constantly, while our enemies, on the other hand, can launch an attack at any particular time they choose, and be relatively safe up until that time comes.

So they have an advantage in this armament race, if you want to state it that way.

Senator SYMINGTON. My final question: You say, if we want to stay free and not be conquered, we have to maintain our forces in being. But your testimony this afternoon states we are not maintaining those forces in being adequately; is that correct?

General LEMAY. That is correct.

Senator SYMINGTON. Thank you, Mr. Chairman.

Senator JOHNSON. Senator Bush?

Senator BUSH. I pass, Mr. Chairman.

Senator JOHNSON. Senator Barrett?

Senator BARRETT. No questions, Mr. Chairman.

Senator JOHNSON. Senator Dworshak, have you any questions?

Senator DWORSHAK. Thank you, Mr. Chairman, I would like to ask one question.

General LeMay, I have always had profound respect for your testimony before the Appropriations Subcommittee which handles the Defense Department budget.

I recall vividly some of the things you told us in the summer of 1956 regarding the need of maintaining efficiency of SAC in case of Communist aggression in Western Europe.

In the past few weeks there has been considerable confusion as well as apprehension throughout the country over the question of adequate financing of national defense.

In the recent session of Congress, the President's budget was cut a total of about \$5 billion, but the Defense budget was cut only approximately 1 percent.

The Assistant Secretary McNeil, Comptroller of the Defense Department, made a speech in September when he pointed out that the Defense budget of about 38 billions of dollars actually was a cut of about \$400 million under the fiscal year of 1957.

That budget was also \$2½ billion more than in each of the fiscal years of 1955 and 1956.

Now with that background and also pointing out that in the fiscal year, this fiscal year, we have approximately \$2 billion, for research and development in the Defense Department, I should like to ask you what in your judgment is necessary to maintain a superior military and national security on an operational basis insofar as aircraft are concerned when there is a total of \$38 billion available this year.

On that basis it would appear that there is not an inadequate amount of money available. Do you think that there is an insufficient budget?

AIR FORCE BUDGET INSUFFICIENT

General LEMAY. As far as the Air Force is concerned, I think that there has been an insufficient budget, yes, sir.

Now possibly we may be able to get along with overall total of \$38 billion, but I don't think that we can do so safely and continue on

the policies that we have had in the past on the types of weapons systems we are going to spend the money for.

If you are going to get adequate airpower under a ceiling of \$38 billion, something else has to give.

There is no other answer. I can only refer to General Twining's testimony while he was Chief of Staff over the last 2 years regarding the allocation of resources to the Air Force for that particular year, and what he had to say about it.

He said in every case it was not enough, that we were delaying the final reckoning and you would have to appropriate much more if you were to get the air defense needed at some future time.

The time has now run out.

Senator DWORSHAK. Do you mean that you believe the Air Force has not received its proper allocation of the total Defense Department budget during the past few years?

General LEMAY. I say that it has not received enough money to do the things that I consider necessary to be done in the field of airpower to guarantee this Nation's security.

Senator DWORSHAK. As I recall in 1956 you testified before the Appropriations Subcommittee that in your judgment we must rely upon SAC to do the job in case of aggression; is that correct?

General LEMAY. That is correct.

Senator DWORSHAK. You still believe that?

General LEMAY. I still believe that.

Senator DWORSHAK. And on that basis you think that we cannot afford to provide inadequate budgets for the Air Force?

General LEMAY. I did not get all of that, Senator.

Senator DWORSHAK. I say in view of the fact that you believe that SAC must meet that challenge and be largely responsible in combating Communist aggression in Western Europe or wherever it may occur, that you think it is highly important that the Air Force, including SAC, be given adequate funds to do the job?

General LEMAY. That is true.

I believe that if we get into a war, a most likely manner in which we will get into it will dictate that SAC will furnish over 80 percent of the striking potential of this country, deterrence power and this country.

Senator DWORSHAK. And you think it is very serious now in facing this world upheaval that we are not more adequately prepared in the Air Force to do that job properly?

General LEMAY. Right.

Senator DWORSHAK. That is all, Mr. Chairman.

Senator JOHNSON. Any other questions?

Senator SALTONSTALL. Mr. Chairman, may I ask one more question?

Senator JOHNSON. Senator Saltonstall.

Senator SALTONSTALL. Just one question.

General LEMAY, I did not quite get what you said to Senator Stennis about the amount, the number of crews you had per bomber.

Did you say 1 or 1.5 crews per bomber, I did not quite get what you said.

General LEMAY. Manpowerwise, I think SAC is planned up to about 1.5 crews per airplane now.

However, the bodies have just arrived in many cases so that they are not trained and in a combat ready condition.

Only about one crew per airplane is combat ready.

Senator SALTONSTALL. Of course, you have got to retrain a B-47 crew when shifting to a B-52?

General LEMAY. Yes, sir.

Senator SALTONSTALL. Thank you, Mr. Chairman.

Senator JOHNSON. Any other questions?

Senator Symington?

CONTENTS OF GAITHER REPORT

Senator SYMINGTON. Mr. Chairman, I would like to insert in the record an article by an able and responsible reporter, Rowland Evans, Jr., of the New York Herald Tribune News Service, "White House To Keep Gaither Report Secret."

-I do this, Mr. Chairman, because in informal discussions in the committee, it was my understanding this report had been refused the committee; and I am very glad to hear that that is not correct.

Senator JOHNSON. I do not want to get into debate about who is able and responsible. I think all of us, even those who are not lawyers, know that a newspaper article is not necessarily evidence that is going to guide this committee, particularly when the only person that has requested the report from the President, the chairman of this committee, was not even asked about whether it had been refused or not.

I don't think I divulge any secrets, but I think in justice to the President, that candor requires that I state the facts as I know them, as I have previously stated them to the Senator from Missouri. I hope he will accept my explanation.

The chairman of the committee asked the President by letter for a copy of the Gaither report and the Killian report. The President has not answered that letter. As we all know, the President is at NATO at the moment and is pretty well occupied.

Yesterday the President sent a representative of his to this committee who asked to talk to the chairman. The chairman left the committee room after requesting Senator Stennis to preside, and talked to the President's representative for some 30 or 40 minutes.

The substance of that conversation was that the President hoped that this committee would receive the information that it needed from that report, and that some means could be developed whereby all of the information the report contained that would be helpful to us would be made available.

However, turning over the document itself would create a precedent in that the report was an NSC document, having been made at the request of the National Security Council, and also was a report of a group of advisers to the President. The President's advisers had indicated to him that if he made the full text of the report available to the committee, that he would be violating precedents that other Presidents had established.

He expressed the hope that some way could be found without breaking that precedent to make available to us all the information that we would need and we would find useful.

I conferred at some length with the ranking minority member and the counsel of the committee, and have arranged for the counsel of the committee to meet with the President's counsel and see if they could develop some procedure whereby we could get all the information we needed without breaking any of the precedents.

If a reporter had asked me about it, I doubt that I would have gone into this much detail because I did not think that such a news story was that essential at the moment. I do think that it is important that we try to work out some machinery for obtaining the information. That is what we are trying to do. I believe we will be successful. If we are not, I will keep the committee fully informed.

I have never indicated to anyone that the President or anyone on his behalf has refused to make the report available. That is not the position he has taken up to now.

Any other questions?

Senator SYMINGTON. Mr. Chairman.

Senator JOHNSON. Senator Symington.

Senator SYMINGTON. Let the record show that I have never discussed the Gaither report with the gentleman who wrote this article.

I would also like the record to show there have been many public articles written about the Gaither report, and if there was any truth in these published articles, they would be important from the standpoint of gaging the testimony, as to its accuracy, of General LeMay.

I would also like the record to show it was my impression, in informal discussion with members of the committee staff, that the report had been refused. I thank the Chair for clarifying me on this. I am very grateful to have this knowledge.

Senator JOHNSON. The chairman has never given that impression because it has never been refused. We have not received it. There is a difference between not receiving it and refusing it, and I want to make that clear.

As far as the Chair knows, the able and responsible reporter the Senator refers to did not consult with the chairman about the status of this report.

Any other questions?

Senator KEFAUVER. Mr. Chairman.

Senator JOHNSON. Senator Kefauver.

Senator KEFAUVER. In deference to Mr. Evans, I believe the article does state that some arrangement was being considered to brief or give the Senators information without actually turning over the report itself. It doesn't report an absolute turndown, but that there would be some method of briefing or giving information otherwise.

Senator JOHNSON. I have not read the article and I have not discussed it with Mr. Evans. All I know is Senator Symington's statement that it was refused. It has not been refused, and I would say that no decision has been made by the White House as yet.

The President said that upon his return he would be glad to take any suggestions we had and try to work out a plan. I assume that no decision will be made until the President does return.

(The article referred to follows:)

UNITED STATES WON'T YIELD REPORT TO SENATE

GAITHER'S FINDINGS TO STAY SECRET

(By Rowland Evans, Jr.)

WASHINGTON, December 16.—The White House had decided to withhold the top-secret Gaither Committee report from the Senate Preparedness Subcommittee, it was understood today.

Despite a formal request from the subcommittee, headed by Senator Lyndon B. Johnson, Democrat, of Texas, the Gaither Committee proposals for an immediate and costly American defense response to Soviet weapons advances will be kept from congressional view. There were indications, however, that the administration might agree to brief the subcommittee on certain portions of the Gaither Committee findings in executive testimony.

The White House decision to withhold the Gaither report will have repercussions in Congress. The report analyzed urgent defense problems and, it is understood, proposed a host of immediate actions by the Federal Government, including an atomic-shelter program. Dr. Rowan Gaither, former president of the Ford Foundation, headed the panel.

Senator JOHNSON. Any other questions of General LeMay? General, I made a statement the other day when Vanguard blew up. I said somehow I kind of cringed with chagrin when we advertised a great event that blew up in our faces. Somehow or other when I hear you testify and give your evaluation of our present capability, I feel comfortable.

I would feel a lot more comfortable if I believed that your recommendations were being translated into action. I believe they will be when the country knows the facts.

We created the atomic bomb in a relatively short time. We created the hydrogen bomb in a relatively short time. We have created a nuclear submarine.

We have the greatest Strategic Air Command in all the world, and I have no doubt but what America will be equal to the challenge, if we give the facts to America.

I want to thank you for your contribution to that end today. You are excused, General LeMay.

General LEMAY Thank you, sir.

Senator JOHNSON. The next witness is Lt. Gen. Donald L. Putt, the Air Force Deputy Chief of Staff for Research and Development.

I will say for the information of the committee members, that we have rearranged the schedule of witnesses to accommodate some of the members of the committee who may not be able to be here this evening and who have questions to put to certain witnesses. We are therefore going to ask Lieutenant General Putt to appear now and will ask Assistant Secretary Horner to appear later on the schedule.

General Putt, will you stand and take the oath, please. Do you solemnly swear that the testimony you will give this committee will be the truth and the whole truth?

General PUTT. I do.

Senator JOHNSON. General Putt is Deputy Chief of Staff for Research and Development of the United States Air Force.

He is a graduate of Carnegie Institute of Technology. General Putt was Chief of the Experimental Bombardment Aircraft Branch at Wright Field during the development of the B-24, the B-29, B-36, and other planes.

He was Director of Research and Development in the Office of the Deputy Chief of Staff for Air Materiel, Air Force Headquarters. Later he became Assistant Deputy Chief of Staff for Development. He has served as vice commander and as commander of the Air Research and Development Command.

In April 1954, General Putt returned to Air Force Headquarters as Deputy Chief of Staff for Development, Military Director of the Scientific Advisory Board to the Chief of Staff, Air Force.

General Putt, we are delighted to have you with us today. Counsel will now proceed with the examination of you.

(The biography of General Putt is as follows:)

LT. GEN. DONALD L. PUTT, UNITED STATES AIR FORCE

General Putt is Deputy Chief of Staff (Research and Development), United States Air Force.

He was born in Sugarcreek, Ohio, on May 14, 1905. He was graduated from Carnegie Institute of Technology with a bachelor of science degree in electrical engineering in 1928.

General Putt was commissioned a second lieutenant in the Signal Corps Reserve in May 1928. After completing his flying training on June 28, 1929, he was assigned to Selfridge Field, Mich.

Ordered to Wright Field, Ohio, in February 1933, General Putt served as a test pilot until August 1936. He graduated from the Air Corps Engineering School and received a master of science degree in aeronautical engineering in June 1938 from the California Institute of Technology. At Wright Field, he was later chief of the experimental bombardment aircraft branch during the development of the B-24, B-29, B-36, and others. From October 1944 to August 1945, he was assigned to United States Air Forces in Europe as chief technical services. Returning to Wright Field, Ohio, in September 1945, he was named deputy commanding general for intelligence of the Air Technical Service Command. In December 1946, he was reassigned as deputy chief of the Engineering Division.

Appointed Director of Research and Development in the Office of the Deputy Chief of Staff for Materiel at Air Force Headquarters, Washington, D. C., in September 1948, he became Assistant Deputy Chief of Staff for Development in April 1951. He was transferred to the Air Research and Development Command at Baltimore, Md., in January 1952, as vice commander, until he assumed command of the Air Research and Development Command on June 30, 1953.

Returning to Air Force Headquarters in April 1954, General Putt was designated Deputy Chief of Staff for Development, and Military Director of the Scientific Advisory Board to the Chief of Staff, United States Air Force.

His decorations include the Legion of Merit with one oak-leaf cluster and the Bronze Star with one oak-leaf cluster.

**TESTIMONY OF LT. GEN. DONALD L. PUTT, DEPUTY CHIEF OF STAFF
(RESEARCH AND DEVELOPMENT), UNITED STATES AIR FORCE**

Mr. WEISL. General Putt, you were recently in Russia, were you not?

General PUTT. That is correct, sir.

Mr. WEISL. Will you please tell the committee what your observation in Russia indicated as to the capability of the Russians in research and development, which is your field?

General PUTT. What we saw in Russia at least convinced me, and I think those of the other members of our party, that they were making tremendous strides in scientific and technological developments.

Mr. WEISL. Would you pardon me, General? Senator Saltonstall suggested that we fix the time when you were in Russia.

General PUTT. It was July of 1955.

Senator SYMINGTON. 1956.

General PUTT. Sorry; 1956 is right.

Mr. WEISL. July of 1956?

General PUTT. July of 1956.

Mr. WEISL. Please continue. Pardon the interruption.

THEY ARE AS GOOD OR BETTER IN SOME AREAS

General PUTT. Yes, sir. While we have the feeling that they did not show us, perhaps, the very latest things that they had, and while many of the things that we saw we would say were inferior to some things that we have or that we had on the drawing boards at that time, we could not help but be convinced that they had a capability of doing as well, and perhaps better, in some particular areas, things that we might do, if in their determination they decided that it was important for them to do.

We know just from unclassified material over many, many years—and I believe you have had witnesses here before that have testified to the same effect—they have always been good in most of the basic sciences. This gives them a tremendous foundation from which to go into applied research, into development, and then into the production of weapons.

Mr. WEISL. Thank you, General Putt. So that we can clarify some of the observations made by General LeMay as to whether or not the Russians have or have not the intercontinental ballistic missile, do you agree with the other witnesses who testified that the fact that the Russians were able to put a thousand-pound satellite in orbit indicates that they have an intercontinental ballistic missile with sufficient power in the rocket engine, with sufficient power in the propulsion, and with sufficient guidance to put a missile in orbit?

General PUTT. They have demonstrated that.

Mr. WEISL. Is it your opinion, General Putt, that, having demonstrated that ability, it is only rational and reasonable for us to assume that they have sufficient guidance to project an intercontinental ballistic missile to the United States?

General PUTT. That is correct. There would still be some doubt as to the degree of accuracy that such a missile would have, but they certainly could hit the United States.

Mr. WEISL. We have talked a great deal, General Putt, about putting ballistic missiles first and satellites second. Are these two systems interrelated?

General PUTT. They certainly are interrelated. As a matter of fact, it is the large-thrust rocket engines that have been developed in our ballistic-missiles program that have given us the capability or will give us the capability of placing satellites in orbit.

TOP PRIORITY FOR BALLISTIC MISSILES AND SATELLITES

Mr. WEISL. Are you of the opinion that we ought to pursue the satellite program along with the ballistic-missile program?

General PUTT. Yes; I am. I think that we have gotten ourselves into a position where it is necessary that we proceed posthaste with both programs, both ballistic missiles and satellites. Now, these two

programs are not necessarily competitive. One complements the other. We need both.

Mr. WEISL. And both have military significance and capabilities?

General PUTT. They certainly do.

Mr. WEISL. And you would not abandon either?

General PUTT. I would not.

Mr. WEISL. And you would give both top priority?

General PUTT. I would.

Mr. WEISL. What are the Air Force plans, General, for ballistic-missile detection?

General PUTT. I will back up and try to answer a question that was asked this morning and at the same time answer your question.

Mr. WEISL. Very well.

General PUTT. The question this morning was asked: When did the Air Force first realize that there was a need for a ballistic-missile-detection system? We were aware of that need in 1946. We have been working on it ever since. At the time that we became aware of the need, it was not then possible nor feasible, technically, to provide such a system. It is to solve these difficult technical problems that we have expended the effort that we have in the interim to try to find the solutions to those problems.

As a result of our fundamental and applied research in radars, and by virtue of what we would class as a technological breakthrough in radars quite recently, we now feel that we are in a position to proceed posthaste with the actual construction of equipment and installation of such a system.

Mr. WEISL. General, as we stand today, do we have any system in operation that could detect the projection of a ballistic missile against the United States.

General PUTT. My answer to that would be, "No," with some slight qualification. On the routes over which a ballistic missile would most likely be traveling from Russia to the United States, I would say we have no capability. We do have a couple of experimental installations where, if the missile happened to come within the range of those particular installations, I believe that they would be picked up.

But we do not have such an installation where we need it now.

Mr. WEISL. General, you were alert, as I well know, to the necessity of providing such a system, and you have been working on it since 1946 more or less.

General PUTT. That is correct.

Mr. WEISL. Why have we not put one in operation? What has happened to us?

General PUTT. The first reason, of course, is that (1) we did not have the technical solution. It is only recently that technically we have been able to do this.

Now, the question could probably be asked, could we have solved the problems quicker? I think the answer to that is yes, had we been able to put more effort into both our fundamental, applied, and some of our exploratory developments in this particular field.

Mr. WEISL. General, what are we doing now?

General PUTT. Right at the moment we are moving just about as fast as technology will let us move.

Mr. WEISL. Have you sufficient funds to move that fast?

General PUTT. As of today, yes.

Mr. WEISL. As of tomorrow?

General PUTT. Literally tomorrow? Yes.

Mr. WEISL. No; I mean do we have sufficient funds, do we have sufficient manpower, do we have sufficient everything that we need to get such a system, because without it, we may never get an alert.

General PUTT. This is right. Let me state it this way. For this fiscal year we have all the funds that we can use as of today. Now, it is possible that 3 months from now, 6 months from now, we will find that there are some things that need doing that we do not foresee right now, and there may be a need for additional funds.

But as we see the need right today, I think we have the funds that are necessary.

Mr. WEISL. And you are proceeding as quickly as it can be proceeded with?

General PUTT. That is correct. If counsel would let me confer with my advisers for a second, I would like to confirm something.

Mr. WEISL. Yes, sir.

General PUTT. A little clarification.

Mr. WEISL. Yes, sir.

General PUTT. We do have all of the research and development money that we need. We will be coming up very soon for supplemental funds for this year for additional P-100 and 200 funds for service test, and the funds necessary to proceed with the installation. We do have sufficient research and development funds as of today.

Mr. WEISL. Thank you. Are the ICBM and IRBM programs now proceeding as rapidly as technically feasible?

General PUTT. The development programs, I believe, are. I would not say absolutely that there is nothing more that can be done. I do not believe that our production programs are proceeding as fast as we are capable of proceeding.

Mr. WEISL. General, may I ask you to comment on some of the information that we received from the developers and producers of some of our intercontinental and intermediate range weapons systems.

Senator SALTONSTALL. Mr. Counsel, would you permit me to ask you to ask that question again as to what production programs the general said are not going ahead as fast as they want? I apologize. I did not hear which programs they were.

Mr. WEISL. Will you advise the Senator?

General PUTT. Yes, sir. Counsel asked about the IRBM and ICBM programs. My answer would apply to Thor, Atlas, and Titan.

Senator SALTONSTALL. IRBM's?

General PUTT. IRBM's and ICBM's, and I would add, as General White outlined this morning—and this is an exception to my previous answer—I do not believe we are proceeding as fast developmentwise with Titan as we should.

Senator JOHNSON. It is your testimony that we are not proceeding as fast as we should or not as fast as our capacity would permit? Your testimony is we are not proceeding as fast as you think we should?

General PUTT. I think both of those are correct.

Senator JOHNSON. Yes; one could be correct without the other.

General PUTT. Right.

Mr. WEISL. Mr. Ramo in writing to us about research and development in the missile field stated as follows, and I quote:

We will progress at a faster rate only if:

(a) Very major changes are made in the Defense Department organization to eliminate interservice rivalry handicaps.

(b) Separate funding is provided for these major programs.

(c) New procurement and research and development policies are instituted that will permit large gambles; and

(d) In the long-run relatively huge expenditures are committed compared with our present trivial ones for basic research.

Do you agree with that comment?

General PUTT. I do.

Mr. WEISL. So that there are basic changes needed in order to accomplish the technological breakthroughs that are necessary if we hope to catch up to or keep ahead of Russia's research and development program?

General PUTT. I firmly believe so.

Mr. WEISL. You do not believe that this country is incapable of doing it, do you, General?

General PUTT. I do not.

Mr. WEISL. So that if we put our shoulder to the wheel and the public and the Congress and everyone concerned are properly informed of the true facts, you believe that we still have time to catch up or get ahead?

General PUTT. I am sure if we will put our shoulder to the wheel, we can.

Mr. WEISL. And the only way we will put our shoulder to the wheel is to find out the real facts about what we face; is that not true?

General PUTT. That is correct.

Mr. WEISL. In connection with the Snark program, and this is not necessarily directed toward the Snark program, the Northrup Aircraft Co. engineer in charge of the program, in commenting on research and development, states as follows, and I quote: This is from a letter dated September 12:

The research and development work has incurred substantial delays due to what amounted to major changes in weapons systems requirements.

Do you agree with that statement?

General PUTT. In general; yes.

However, I would not want to infer that all of the changes made in weapons systems requirements were necessarily bad.

Mr. WEISL. That is right. I agree with you, General.

I think that this is not a fair criticism of any kind.

There must be requirement changes if we are to get the proper weapons.

General PUTT. That is correct.

Mr. WEISL. General Putt, would you care to tell the committee what you believe ought to be done to speed up the research and development program so that we get modern weapons in time to meet the Russian threat.

General PUTT. Knowing the pattern of your questioning, Mr. Weisl, I have put some things down on paper so I would be sure not to forget them.

I would like to refer to these notes.

First, I think I would like to go from the general to the specific, if I might.

Mr. WEISL. Yes, sir.

General PUTT. It is very easy to say all we need is more funds.

I think there are some other things that are needed if we are to establish the right pace and to maintain that pace in order that we still stay in this race.

It seems to me that if we establish or achieve the things that I have in mind, the funds will come along.

First we need an education program, and at this point I am not referring to the education of scientists and engineers, but the American public must be made aware of the part, the place that modern science and technology plays in, 1, our national progress, and, 2, their contribution to our military strength.

Science and technology is really the foundation and the basis of our national growth today.

Likewise, it is the basis for our capabilities for developing modern weapons.

Now, it seems to me that to properly educate the public is a responsibility of our Nation's leaders, of the administration, whichever one happens to be in office, of the Congress, and all of those who have an appreciation of the problem that faces us.

Mr. WEISL. Including the military, to tell the facts to the Congress and to the people clearly and definitely.

General PUTT. Right.

Mr. WEISL. And without restraint, isn't that true, General?

General PUTT. Right.

Next, we must then have decisions. These decisions must be made quickly, and "quickly" is a relative term, because in this complicated business a decision that takes 24 hours might be too long; and, on the other hand, one that takes 6 months might in certain instances, be too soon.

However, once having arrived at our decisions, we must be consistent in pursuing a course of action, and we must stop the "go and stop" process that we have been using in the past, the continual review of programs, the continual mixing up of organizational responsibilities between different levels, and give the man that has to do the job the power and the authority and the resources to do it, and then get out of his way and let him go.

Mr. WEISL. Does that exist in the present setup in the Defense Department or in the military organizations?

General PUTT. Not nearly to the degree that it should.

I think that there is much that we can do to improve the present situation. Now, I realize that it is very easy to point out what is wrong and what the deficiencies are, and it is extremely difficult to recommend what should be done that would improve the situation.

I would like, now, to get on to perhaps some more specific things that we should be doing.

Many recommendations have been made this morning by previous witnesses. I agree with all of those. I will confine myself here primarily to things that need doing in the research and development field.

First—and by “first” I don’t mean that these are in order of priority necessarily, first, in the field of ballistic missiles, as has already been stated, we should achieve a significant operational ICBM and IRBM capability just as quickly as we can. We should establish a vigorous research and development program for advanced ballistic missiles. We have one established, but it should be more vigorous than it is, for follow-on ICBM’s and IRBM’s.

There are many improvements to be made in size and costs, in improved accuracy, reliability, and mobility.

IRBM WITH AN AIR-LAUNCHED CAPABILITY

We should be developing IRBM’s with an air-launched capability.

We should be developing solid propellant land-based weapons to replace our tactical missiles, such as the Matador, which is now in operation.

Senator SALTONSTALL. What is that word, “propellant”?

General PUTT. Solid propellant land-based tactical ballistic missiles.

In the field of astronautics, we should be doing everything that we can in the field of satellites, space vehicles, manned and unmanned. There are many military purposes and peaceful purposes for which they can be used.

In air defense, we must have more emphasis on our SAGE system and Bomarc.

We must accelerate the development and production of ballistic missile early warning detection systems. We have already touched on that.

We must get on with the development and production of active ballistic missile defense weapon system. We must not overlook and must start work in the antisatellite missile field.

We must improve our surface-to-air medium range missiles, with capabilities from sea level up. These would be follow-on missiles to Bomarc.

And then across the board we must put considerably more funds into basic research and applied research.

That is quite a list. I think I would stop there.

Mr. WEISL. General, you have covered a lot of territory.

What we are trying to find out is how we can accomplish these things and how we can put first things first, and how we can accelerate the production of what we need to meet the threat.

Now, you spoke of the decision-making process. Do you think it is too slow?

General PUTT. I do.

Mr. WEISL. Do you think speeding it up would cut down the lead time in making weapons?

General PUTT. It would.

Mr. WEISL. Have you any suggestion as to how we can speed up that decision-making process that exists?

General PUTT. Let me first use the IRBM and ICBM as an example. I think here we need two things: One, proper authority should determine what it is we need. Two, tell General Schriever what it is he is to do, give him the resources, the authority, and let him go to it.

Mr. WEISL. That is what we should do. Do we do it?

General PUTT. We have not yet.

Mr. WEISL. Is there any reason why we cannot do it? Is it due merely to production or redtape or what? What is it that is causing all of these things?

General PUTT. Well, it is a myriad of things. It is not easy, a lot of things have to be taken into consideration, but I do believe that improvement could be made. This is not a very specific recommendation.

Mr. WEISL. Can you give the committee some specific instances of how this failure to make decisions on time has impeded the production of weapons?

General PUTT. Well, if I might refer to one that is fresh in everybody's mind. I believe there was a small delay, although the situation was corrected quickly enough so it was not serious, during the period of time when the decision, to put Thor or Jupiter into production was being considered. There was a hold on the provision of ground handling equipment and the things necessary to make the Thor operational.

As I say, that restriction was removed soon enough, so I doubt whether any significant damage was done, but it is illustrative of the thing that does happen.

Mr. WEISL. Let us try to be a little more specific, General. Do you think there are too many duplicating decision-making agencies, one agency duplicating what another agency could do?

TOO MANY PEOPLE HAVE TO BE CONSULTED

General PUTT. I would not exactly call it duplicating, but I think it is a matter of too many committees or offices that need to be cleared before a clear green light is given.

For instance, assume a research and development project has been proposed by the service, by any of the services. The project has to be approved by the Assistant Secretary of Defense for Research and Engineering.

Let us assume that this research and development project requires some facilities. The Assistant Secretary of Defense for Research and Engineering, cannot give the approval for the facilities.

Mr. WEISL. Why not?

General PUTT. It is not broken down that way. The Assistant Secretary of Defense for Properties and Installations must then be contacted for approval of the facilities that are required.

Mr. WEISL. Then what does he do?

General PUTT. Well, finally, he would approve or disapprove the facilities. Of course, if they are disapproved, you have got a problem on your hands. If they are approved, then one must get proper allotment and allocation of funds from the Comptroller.

Mr. WEISL. What does the Comptroller do? What do you have to do, I mean, to get that from the Comptroller?

General PUTT. Well, usually if they have any question, one must justify the project to each of these offices to the extent that they deem necessary.

Mr. WEISL. You have to justify it to the Comptroller. Has he any staff that are experts or know any more than the Director of Research and Engineering and the head of it, the Assistant Secretary in Charge of Facilities?

General PUTT. No. However, the Assistant Secretary of Properties and Installations will have construction experts on his staff who will inquire as to whether the facilities have been well thought out from a construction standpoint; are they being done as cheaply as possible. It is proper, I think, that we pay some attention to economy.

Then the Comptroller is concerned in our financial plan, whether we have planned right, whether the funds are being properly apportioned and phased according to good businesslike methods.

Mr. WEISL. Then what happens after the Comptroller decides that they are properly phased?

General PUTT. Well once, you get your money, you are in pretty good shape until somebody raises a question as to whether this is a good program or not.

Mr. WEISL. Whom do you have to go back to again to find out that this is a good program after the Assistant Secretary in charge of research and development, the Assistant Secretary in charge of plants and facilities, and the Comptroller agree that it was all right?

General PUTT. Well, at any time, I am sure you would appreciate that any one of the Assistant Secretaries, members of their staffs, can raise questions about projects and programs.

Mr. WEISL. Has not anyone the authority in the Department to say, after you get the money and have gone through this long decision-making process and justification process, should not that end it? We had the testimony here of Professor Livingston indicating that it took the United States on an average twice as long to make a weapons system as it did the Russians; and is not what you have just described one of the reasons for the delay, where you have to go through several sources in order to get a facility authorized and financed?

General PUTT. It is part of the problem.

Mr. WEISL. In your judgment, based upon your experience, is it necessary or is it good business practice to go through all those sources before you can get a facility program authorized?

General PUTT. I think there certainly must be some better way of doing it, some quicker way of doing it.

Mr. WEISL. I regret, General, that my 30 minutes of questioning are up so I will have to cease at this point. Thank you very much.

Senator JOHNSON. General Putt, how much more money could you effectively use in Air Force research this next year?

General PUTT. How much more do we expect to use?

Senator JOHNSON. How much more could you effectively use?

General PUTT. Could we effectively use. I think something in the order of—everybody will have to give judgment on this—but I would say somewhere in the order of \$150 million to \$250 million.

Senator JOHNSON. Did you make your request for that?

General PUTT. No, sir.

Senator JOHNSON. Why?

General PUTT. The budget process does not provide the—let me start over. In the past—

Senator JOHNSON. You might want to answer another question before we get to that one. How much more could you use in develop-

ment effectively? If you could use \$150 million to \$250 million more in research, how much more in development?

General PUTT. I was including research and development as defined by our budget program, P-600.

Senator JOHNSON. And you figure there it would be somewhere between \$150 million and \$250 million?

General PUTT. That is correct.

Senator JOHNSON. All right. The present plans do not provide the money. Tell me why they do not?

General PUTT. Under the ground rules by which the budget was prepared this year, there was not the opportunity as of now to do this.

Senator JOHNSON. That is a very informative statement. Now, break it down to where I understand what you mean.

General PUTT. Let me confer just a moment.

Senator JOHNSON. Are you a career officer?

General PUTT. That is correct.

Senator JOHNSON. You were not in the diplomatic service before you came to the Air Force? [Laughter.]

General PUTT. No, sir.

Senator JOHNSON. Go ahead. You missed your calling, General. [Laughter.] Go ahead.

General PUTT. Pardon me just one moment.

Mr. Chairman, the Air Force was given guidelines in submitting our budget for this year.

Senator JOHNSON. So your budget is based on the guideline and not on the need?

General PUTT. That is correct.

Senator JOHNSON. Do you think that is the way to run a railroad or an Air Force?

General PUTT. As an Air Force officer, as a military officer, it does not seem to me to be the correct way to run a railroad and I have full appreciation for the fact that there must be a balance between—

Senator JOHNSON. I understand.

General PUTT (continuing). Between our economics—

Senator JOHNSON. I understand that.

Did you say that SAGE should be expedited?

General PUTT. Yes; it should.

Senator JOHNSON. Why then was the request for an additional \$35 million SAGE construction authorization received only during the last week of the last session of Congress, too late to be acted upon, when better than a year had gone by since the preceding request? When did the Air Force initiate that request for this \$35 million that came to the Congress the last week of the last session? When was it initiated by the Air Force? When was it approved, and by whom, for submission to the Congress?

General PUTT. Mr. Chairman, I would not be able to answer that because, those requests went through channels other than research and development.

I believe the following witnesses will be able to answer that.

Senator JOHNSON. You admit, though, if a project should be expedited and if it is important and it is necessary, we ought to get the request before the last week in the dying hours of Congress, do you not?

General PUTT. I would think so; yes, sir.

Senator JOHNSON. I am going to yield back the balance of my time. Senator Saltonstall.

Senator SALTONSTALL. Thank you, Mr. Chairman, I will be very brief, General Putt.

I would like to ask you two general questions:

You have submitted 11 suggestions for improvements in research and development as I wrote them down.

I certainly have listened to you before, and I have listened with great respect for the need of research and development in the air programs; without any question.

One thing that bothers me very much is this:

We want to keep and maintain and build up our present SAC force so that it will continue to be the greatest deterrent that we can make it.

As an Air Force officer you agree with that, don't you?

General PUTT. Yes, sir.

Senator SALTONSTALL. And we have got to give that sufficient priority with all these other things that you mentioned and other officers for whom I have respect have mentioned. We have got to make certain that we keep our force in being?

General PUTT. Maintain SAC.

Senator SALTONSTALL. To keep our present force in being?

General PUTT. It is essential that we do. I don't want to modify that but add something to it. I think that we are in a position where we must do both.

In other words, we have got to take care of today's deterrent force.

We have also got to do the things that need doing today so that when we get to tomorrow we will not have slipped back at that time.

Senator SALTONSTALL. I agree with that statement. That is very well put.

Let me ask you 1 more question, or 2 more.

There has been a new directive given by the Secretary of Defense, Mr. McElroy, that creates this Office of Director for Guided Missiles and so on, with the present personnel, Mr. Holaday, in it.

Do you think that that authority is sufficient to get quick decisions and action so far as you have come in contact with it.

DOUBT AS TO AUTHORITY OF HOLADAY OFFICE

General PUTT. Well, it is probably too early to say with conviction whether it is or not, because he has not had an opportunity yet to do all the things that I am sure he thinks needs doing.

I do have some concern with the way in which I understand the office works as to whether or not the office really does have the authority and directive authority within that office, alone, to get the job done.

Senator SALTONSTALL. If it has not then the bugs have got to be taken out of it, but so far as you are concerned, it is a step in the right direction and you hope it is a good step.

General PUTT. Anything that will centralize authority and give direction to the program is a good step.

Senator SALTONSTALL. May I ask one clarifying question with respect to what Senator Johnson asked you as it is not quite as clear in my mind.

General PUTT, you said you could use a hundred fifty to two-fifty million more in research and development, next year.

Now, it is my understanding that in the Department of Defense as a whole—I do not have the figures broken down in the Air Force—we have in this fiscal year approximately one billion six for research, and approximately three billion four more for development or a total of around \$5 billion.

When you say 150 to 250 million more, do you mean in research or do you mean in research and the development also?

I assume you mean research. I wanted to clarify that.

General PUTT. In the terms that I understand you are using the 150 to 200 million would be in what we call research and development funds, the P-600 account.

Senator SALTONSTALL. That relates to the one billion six, in the overall defense?

General PUTT. That is correct.

Senator SALTONSTALL. That is what I wanted to clear up.

General PUTT. Yes, that is correct.

Senator SALTONSTALL. And then you do have your share of this three billion, four, in round figures in the development?

General PUTT. That is right.

Senator SALTONSTALL. Do you want to increase that sum also?

General PUTT. That is correct.

Senator SALTONSTALL. How much do you want to increase that?

General PUTT. If we took the figure of 200 million in the P-600 account, this other account should be increased roughly about 600 million.

Senator SALTONSTALL. Six hundred million more?

General PUTT. That is correct.

Senator SALTONSTALL. Or a total overall increase in research and development as those two funds are used of approximately \$800 million in the Air Force?

General PUTT. That is correct.

Senator SALTONSTALL. Thank you, Mr. Chairman.

Senator JOHNSON. Senator Kefauver?

Senator KEFAUVER. General Putt, this morning about noontime Secretary Douglas gave us the good and exciting news that the Atlas had been fired successfully down at Cape Canaveral.

Do you have any more information about it?

General PUTT. I personally have no additional information other than was read by the chairman when we convened this afternoon.

Senator JOHNSON. I see the Secretary of the Air Force is here. If the Senator will yield at that point I wonder if the Secretary

would like to avail himself of the opportunity to bring any additional information he may have in connection with that subject to the attention of the committee.

Secretary DOUGLAS. Mr. Chairman, I have no additional information.

Senator JOHNSON. I want to ask the Secretary if he would, through channels, keep the committee fully informed of the extent of the test and the details relating to it.

General PUTT. I will be happy to do it.

Senator JOHNSON. Will you do that, Secretary Douglas?

Secretary DOUGLAS. Yes, sir, I shall.

Senator JOHNSON. Thank you. Senator Kefauver.

(Subsequently, the Department of Air Force filed a classified memorandum with the subcommittee on the December 17, 1957, Atlas firing.)

Senator KEFAUVER. General Putt, what are the chief bottlenecks you have in the manufacturing of Air Force missiles, Titan, Thor, and Atlas?

Do you have a bottleneck in the heat testing of the jackets for the missiles?

General PUTT. I do not believe that that is a bottleneck.

However, I believe that General Schriever, who is here and will be a following witness and is much closer to the program than I am, would be a much better source of information in that regard.

Senator KEFAUVER. Then I will ask General Schriever about it later on.

General Putt, I am not exactly clear on just what the latest arrangement is between you and Mr. Holaday, and, as a matter of fact, his general position is still considerably confused.

Are you running the Air Force part of it under his direction? Do you report to the Secretary of the Air Force or do you report to Mr. Holaday? Just what is the chain of command now that Mr. Holaday has come into the picture?

General PUTT. Well, as an Air Force staff officer, of course I report to the Chief of Staff of Air Force, General White.

As pertains to my staff function as being in charge of research and development, so far as ballistic missiles are concerned, I would deal, within the area of my responsibility, with Mr. Holaday's office.

Senator KEFAUVER. Does he give you orders in connection with ballistic missiles which you follow?

Do you make suggestions to him or do you have to go through the—or do you go through the Secretary of the Air Force?

General PUTT. On day-to-day problems having to deal with the program I would say we go direct.

On things that are major changes to funding programs, or the establishment of new programs, obviously these would have been approved by the Secretary before we would go to Mr. Holaday.

But after the program is approved, the day-to-day operation is pretty much direct.

Senator KEFAUVER. Do you feel that until there is a better definition of who has the authority and responsibility for this new situation,

there is going to be more confusion than there was before, so far as getting something done is concerned?

General PUTT. As I said before, it is a little difficult to say positively whether it is improved or not. It seems to me there is the possibility that it might not have been improved because, if I understand the operation properly, Mr. Holaday does not have authority even within the field of ballistic missiles over the other Assistant Secretaries of Defense.

In other words, they still exercise their respective authorities.

Senator KEFAUVER. I understood him to say that he could tell the Secretary of the Air Force, Navy, or the Army what to do in the field of ballistic missiles, he was the supreme boss.

General PUTT. This is what he said. He was referring to Assistant Secretaries of Defense, not Secretaries of the Army, Navy, and Air Force.

Senator KEFAUVER. Anyway, you do feel in the interests of efficiency, and knowing who to look to for direction, that some clarification would be a good thing?

General PUTT. That is correct.

Senator KEFAUVER. Thank you, Mr. Chairman.

Senator JOHNSON. Senator Flanders.

Senator FLANDERS. Thank you, no.

Senator JOHNSON. Senator Stennis.

Senator STENNIS. I have no questions.

Senator JOHNSON. Senator Bush.

Senator BUSH. Mr. Chairman, a good deal has been said this afternoon about the question of funds, and some days ago we as individual members of this committee were handed a memorandum entitled, "Programed obligations totals for United States missiles programs, Department of Defense, fiscal year 1946 through fiscal year 1958."

Since a lot of this money has gone to the Air Force programs, and there has been so much discussion of it this afternoon, it occurs to me that it would be a good idea to insert in the record at this point a copy of this memorandum. This memorandum shows that the total missiles program began to be stepped up very rapidly in 1951. The prior year it had been only \$134 million, but in 1951 it was jumped to \$784 million. It then was accelerated pretty rapidly until in the fiscal year 1958 the preliminary figure is \$4,638 million for the total missile program, of which figure \$1.4 billion is in the IRBM and ICBM programs.

So I think that this should be put into the record to show that the sums we are talking about are very, very large sums, even though some of the gentlemen, some of our witnesses feel that they are not enough.

Do I hear approval of my request that this be inserted in the record at this point, Mr. Chairman.

Senator STENNIS. Without objection, the matter will be inserted in the record.

(The memorandum referred to is as follows.)

Programed obligation totals for United States missiles programs, Department of Defense, fiscal year 1946 through fiscal year 1958¹

[In millions of dollars]

	Total missile program	Surface-to-surface program ²	Long range surface-to-surface program ³	IRBM and program ⁴
Fiscal year:				
1946 and prior.....	70	19	9	(3)
1947.....	58	20	6	
1948.....	81	36	11	
1949.....	98	45	18	
1950.....	134	65	22	
1951.....	784	186	113	
1952.....	1,058	240	143	
1953.....	1,166	406	270	3
1954.....	1,067	350	258	14
1955.....	1,470	559	376	161
1956.....	2,270	902	679	515
1957.....	4,283	2,000	1,743	1,380
1958 (preliminary).....	4,638	2,100	1,928	1,400

¹ Program data contained in this table include the cost of bringing guided missile weapon systems to an operational status, combining research and development, production facility expansion and tooling, procurement, contract, and military overhead to support missile testing and certain construction costs for research and development. The figures above do not include military pay, the cost of maintaining and running operational sites, construction installations not included in research and development costs, or building or converting ships incident to the guided-missile program.

² Each of the above columns is a part only of the preceding column to the left.

³ Totals less than \$1,000,000 are not included above.

⁴ Unusually high expenditures in fiscal year 1957 were due to a large nonrecurring capital investment in test facilities.

Senator SYMINGTON. May I ask what that is? I was trying to follow the Senator's statement.

Senator BUSH. Will you give this to Senator Symington, please?

Senator SYMINGTON. I am fully in accord with having it in the record, but I would like to look at it.

Senator STENNIS. Is there objection?

Senator SYMINGTON. No, Mr. Chairman.

Senator STENNIS. The matter will be inserted in the record.

Senator BUSH. We all have had copies of this. At least, I got one a week or two ago.

I wonder, General, you mentioned the fact I think that there were a large number of committees. I wondered whether we might have embarked on too many programs in the missile field? I have seen a list of those, a top secret list. Our committee has been given that. There are a large number of missile programs, and I am just wondering whether you feel that overall we have embarked on too many programs in the missile field?

Do you or do you not feel that way?

General PUTT. Again this is a matter of judgment in which I am sure there would be a lot of differing opinions. I think in some particular areas there may have been too many. In other areas I do not believe there have been enough.

Senator BUSH. You feel that the programs which are now active that you are familiar with in the Air Force and in the other services are all essential, and that we are not conducting any programs which we could do away with to the advantage of the overall picture?

General PUTT. I believe we should proceed in general with those that we have.

Senator BUSH. You are familiar with what the other services are doing, of course, in this field?

General PUTT. Yes; in not a detailed way but general programs.

Senator BUSH. I do not want to embarrass you, but I mean you feel that the programs that you are familiar with, which the other services as well as yours are conducting, are important and should be continued so far as you know, is that right?

General PUTT. Yes.

Senator BUSH. Mr. Chairman, I have no other questions.

Senator STENNIS. Senator Symington.

Senator SYMINGTON. Thank you, Mr. Chairman.

General PUTT. It is good to see you here. Speaking of your career, as I remember, in 1935 you were in the first B-17 that ever took off, is that right?

General PUTT. That is correct.

Senator SYMINGTON. It did not get very far, did it?

General PUTT. Not very.

Senator SYMINGTON. But you were one of the ones not killed, is that right?

General PUTT. That is right.

Senator SYMINGTON. That was when—1935?

General PUTT. 1935.

Senator SYMINGTON. And you have had that type and character of experience over a score of years in the development and research of the Air Force, right?

General PUTT. Right.

Senator SYMINGTON. You look after the qualitative aspects of the Air Force in your position, is that correct?

General PUTT. That is correct.

Senator SYMINGTON. General, I have just a few questions here. In the airpower hearings in 1956 you testified that the Soviet rate of research and development progress is like a sharply rising curve, while ours is more a straight line. Later in the testimony you stated that the Soviets have gained "many generations since World War II."

I was always impressed with that. How many years is a generation in research? Is it 5 or 7?

General PUTT. Roughly 5 to 7 years.

Senator SYMINGTON. Roughly 5 to 7 years?

General PUTT. That is correct.

Senator SYMINGTON. You went to Moscow with General Twining, did you not, a year and a half ago?

General PUTT. That is correct.

Senator SYMINGTON. And you stated at that time that, if we did not act promptly, the lines of those curves would intersect and the Soviets would go ahead. Have they intersected yet, in your opinion?

General PUTT. Senator Symington, I believe that it is impossible to categorically say that they have or have not intersected. However, I think this is a real important point. This question is asked quite often and I think it bears some explanation for the benefit of all who must appraise our relative strengths. It is not a horserace of two horses and

a question of which horse is ahead. It is more nearly like a yacht race between two yacht clubs in which each club has 25 or 50 yachts.

Senator SYMINGTON. Would you say those lines were closer than they were when you testified a year and a half ago?

General PUTT. I think they are closer.

Senator SYMINGTON. Would you say that some of the yachts in the Russian force are ahead?

General PUTT. That is correct.

Senator SYMINGTON. And some behind?

General PUTT. That is correct.

Senator SYMINGTON. Would you say with the newer weapons the chances are they are probably ahead?

General PUTT. Right.

FUNDING BY GUIDELINES DOES NOT CONSIDER REQUIREMENTS

Senator SYMINGTON. I believe that the counsel questioned you on guidelines and ceilings, or the chairman did. Do you believe that funding guidelines and ceilings are established today, still without due regard to technical requirements?

General PUTT. I believe so.

Senator SYMINGTON. If that is true, that means that we put fiscal considerations, at least in the research and development field, ahead of security considerations, does it not?

General PUTT. Security from a military standpoint.

Senator SYMINGTON. Have these limitations on funds delayed a lot of programs?

General PUTT. I believe that they have.

Senator SYMINGTON. Secretary Quarles testified that it was a wise and effective measure to utilize a budget limitation as a means of forcing greater selectivity within the total research and development program.

Do you agree with that?

General PUTT. In principle but not in degree.

I don't think anybody would subscribe that we ought to have an open door to the United States Treasury for everything that everybody can think about doing.

There has to be selectivity. But the ceiling has to bear some relationship to what the overall total requirements are, and I feel that that ceiling has been set too low in the past several years.

Senator SYMINGTON. You do feel that?

General PUTT. That is right.

Senator SYMINGTON. You feel it is too low even for the coming year despite sputnik?

General PUTT. I think so.

Senator SYMINGTON. From the standpoint of what you could best do with respect to research and development effort, is that right?

General PUTT. That is right.

Senator SYMINGTON. General, you wrote an article, you wrote 4 articles as a matter of fact, in the Air Force magazine in 1952, and I would like to refer to just 1 of those articles.

ICBM CHARACTERIZED AS "FANTASTIC"

We had a lot of discussion last evening about the importance of scientists, and certainly I agree that scientists are mighty important in this picture.

Now in this article you quoted the most prominent scientist in the country at that time as believing that a long-range ICBM was fantastic. He said in a public hearing:

I wish the American public would leave that (the long-range missile) out of their thinking.

(Senator Carroll entered room.)

Senator SYMINGTON. Mr. Chairman, I don't want to pursue this. It is in considerable of the testimony last night, but I would appreciate the opportunity of putting a portion of this article in the record at this point.

Senator STENNIS. Is there objection?

The Chair hears none. Without objection the Senator will extract the part he wishes to include and it will be included.

(That part of General Putt's 1952 article is as follows:)

While testifying before the Special Senate Committee on Atomic Energy in December 1945, Dr. Vannevar Bush stated:

"* * * We have plenty enough to think about that is very definite and very realistic—enough so that we don't need to step out into some of these borderlines which seem to be, to me, more or less fantastic.

"Let me say this: There has been a great deal said about a 3,000-mile high-angle rocket. In my opinion, such a thing is impossible today and will be impossible for many years.

"The people who have been writing these things that annoy me * * * have been talking about a 3,000-mile high-angle rocket, shot from one continent to another, carrying an atomic bomb and so directed as to be a precise weapon which would land exactly on a certain target, such as a city.

"I say, technically, I don't think anybody in the world knows how to do such a thing, and I feel confident it will not be done for a very long period of time to come * * * I think we can leave that out of our thinking. I wish the American public would leave that out of their thinking."

Dr. Bush's statements were made in criticism of a report issued at that time by General of the Army H. H. Arnold, then commanding the Army Air Forces. It happens that General Arnold's report was based on the results of about 1 year's study of the problems of airpower development by a group of eminent scientists, under the leadership of Dr. Theodore von Karman, generally recognized as the world's leading aeronautical scientist. Here is what this AAF Scientific Advisory Group had to say about the matter (in December 1945), after a review of German rocket developments:

"In addition to the German view that the final guided missile would be completely automatic in operation, the possibilities of long-range strategic bombing were fully understood. There is no question but that the diversion of the efforts of the Peenemunde scientists in 1943 to the development of an anti-aircraft guided rocket delayed the introduction of the winged V-2 rocket (A-9) and its successor, the transoceanic rocket (A-O plus A-10). Drawings and computations had been completed for A-10, a rocket weighing 85 tons with a thrust of 200 tons to be used as a launching rocket for A-9 accelerating it to a speed of 3,600 feet per second. The motor of A-9 would accelerate it further to a speed of 8,600 feet per second, giving it a range of about 3,000 miles. Some consideration was given to the design of one version of A-9 carrying a pilot. The scientific advisory group agrees that the German results of wind-tunnel tests, ballistic computations, and experience with V-2 justify the conclusion that a transoceanic rocket can be developed."

My review of this matter is definitely not meant to detract from Dr. Bush's major contributions during World War II—particularly in the A-bomb and microwave radar programs—as Director of the Office of Scientific Research and Development. I feel that Dr. Bush undoubtedly would have spoken differently

had he either participated in an intensive study of airpower research and development problems, or had he been in General Arnold's position at the time. Needless to say, the Air Force has been and will continue supporting a program for developing intercontinental missiles. And substantial progress is being made toward our ultimate goal—the development of an intercontinental guided missile of supersonic speed and equipped with an atomic warhead.

My reason for being explicit about this is to emphasize the point that each individual must look beyond what he reads about guided missiles. The only sound way to eliminate confusion and evaluate a man's statements in this field is to learn first about his background—his training, experiences, and prejudices—and then evaluate his statements accordingly.

With this background, let us turn to the three fundamental guideposts which may help us evaluate some of the future news releases about guided missiles.

First, the successful development of operational missiles must be preceded by many years devoted to building a sound foundation of new research knowledge, usually the development of new types of industrial capacity, and always the construction of major facilities for experimentation to meet the challenge of the supersonic era.

The principal German advantage in the field of guided missiles was the lead time in the development of rockets, which were considered to have serious military applications as early as 1935. Basic research began some years earlier—the first rocket in the V-2 series was fired in 1935—and much effort was put into this field. As a result, the supporting industrial developments were ready as a foundation for missile designers. They could buy rocket motors and rocket fuels commercially. In addition, after V-E Day, Allied scientific teams found an amazing series of high-speed wind tunnels and jet-engine test facilities. Yet the first operational V-2 was not fired until September 1944, late in the war. Thus, we can safely say that it took the Germans more than 10 years to lay the necessary foundation of research, supporting industrial capacity, and experimental facilities.

The comparable American picture seems to have been permeated with an uninspired, pessimistic outlook. For example, when General Arnold initiated action on assisted takeoff for bombers in the fall of 1938, one scientist referred to the project as "the Buck Rogers job." The following year an attempt to secure funds for the first supersonic wind tunnel in this country—more than 5 years after similar facilities were available in Europe—was greeted with proposed public hearings against the idea, under the slogan "prevent duplication." As a result of the general attitude which has prevailed over aeronautical research and which continues in some scientific circles today, we now are faced with this discouraging fact: the first technical facility to begin operation this year at the Arnold Engineering Development Center will be the BMW engine test facility, which was operating in Munich, Germany, at the end of the war in 1945.

Much valuable time has been lost within the Department of Defense while several learned committees and panels have considered the need for similar jet engine test facilities in the United States. On the industrial side, as might be expected, the Americans have been rapidly forging ahead. Postwar progress in manufacturing solid and liquid fuel rocket motors by such companies as Aerojet and Reaction Motors is encouraging.

Of course, we have exploited to the maximum the German research results which became available after the war; however, we've had only 7 years since World War II. Therefore, it is not surprising that no major achievements in the guided missiles field have been announced before 1951—the foundation for guided missiles work in this country is just being completed.

Second, the scheduled introduction of guided missiles into operational units depends primarily upon increased accuracy and reliability of guidance and control systems.

Air Force concepts of precision strategic and tactical bombing have been carried over into the pilotless aircraft field. The original German code name for the V-1 was Kirschkern (cherry pit) because it was designed to be an unguided weapon "spit out" against England. If we had felt it sound to accept V-1 inaccuracies, the Matador could have been ready for operational use some time ago.

Closely connected with accuracy is reliability. In piloted aircraft, an abort rate of about 5 percent is generally considered acceptable. If atomic-warhead-carrying missiles were involved, this rate would mean "throwing away" 5 percent of the atomic stockpile, since the warhead can rarely be recovered from a missile which really "aborts."

Thus, the Matador development really means that the Air Force expects to achieve acceptable standards of accuracy and reliability by the time operational units are fully organized and trained.

Missile accuracy and reliability depend heavily upon the electronic components of the guidance and control system. In this connection, I would like to refer to the first article in this series, in which I discussed the transistor—a tiny electronic invention which represents a major improvement over the vacuum tube and which can be expected to replace it in control applications. Anyone who understands guidance and control problems could have guessed that a large missile—like the Matador—would be announced first, since complex electronic components require considerable space. But with the transistor, such complex electronic gear will fit into much smaller spaces; hence, we can look for more rapid progress in the introduction of smaller ground-to-air and air-to-air missiles.

Third, until acceptable day-to-day operational results are obtained with missiles under combat conditions, missiles and piloted aircraft will be developed and used side by side.

This is the Air Force's "mixed-force" concept. No responsible military leader would suggest abandoning a piloted-aircraft program in favor of a mechanical gadget which has not been proven. On the other hand, missiles promise such important advantages over piloted aircraft from both operational and economical points of view (see Freedom from Want and Waste, by the author, in the January Air Force—Ed.), that they must be developed, tested, and evaluated under actual, or effectively simulated, combat conditions. Until this is done, however, look for the missile and piloted-aircraft programs to proceed side by side.

In summary, then, these are the guideposts for evaluating announcements concerning guided missiles:

The solid foundation of research knowledge, industrial capacity, and military test facilities are just being completed. Look for more rapid progress from here on.

Accuracy and reliability will determine the timetable for effective operational use of missiles. Complex electronic components of missile guidance and control systems will set the limits on accuracy and reliability. The greatest opportunities for further improvements exist in this area. Although the transistor will help, we still have far to go.

Missiles will be used side by side with piloted aircraft until operational experience confirms that we can attain a greater margin of combat effectiveness by eliminating the pilot and resorting to pilotless aircraft altogether. Mixed forces will be with us for some years to come.

As the squadrons of our first pilotless bomber are being formed, it will pay us to reflect that—from a development point of view—the B-61 already is becoming obsolescent. This is a dynamic era, in which changes are taking place rapidly—so rapidly that we can not afford any roadblocks to progress, particularly in the form of traditionalism, a kind of human frailty which might turn our minds to the past at the expense of the future. It has been said that the Air Force "never turns back from a mission." In our never-ending quest for the four freedoms, we must all do our best to see that the Air Force never turns back from a new idea.

Senator SYMINGTON. I thank the Chair.

In this article, in which I am sure the members of the committee will be interested, General, you made a number of what now turned out to be very farsighted technical forecasts. Also, in the same article, you advocated a philosophy of development.

That part of your article I put in has to do with that.

Is the development philosophy you advocated in 1952 still valid today, in your opinion?

General PUTT. I think it is.

Senator SYMINGTON. Now you mentioned the feasibility in this article of air launching of the Matador. I believe we called it the B-61 in those days, is that right?

Is that the Matador?

General PUTT. The Matador.

Senator SYMINGTON. In light of current emphasis on the ICBM and the IRBM, do you believe that air-launched missiles still have a future in the Air Force?

General PUTT. I certainly do.

Senator SYMINGTON. While we are at it, even though you are in research and development, you have been around the Air Force a long time, and you have grown steadily in position.

Do you agree with General LeMay that we had better not concentrate entirely on just missiles and should start giving consideration to building up our forces in being?

General PUTT. We have to concentrate on both.

Senator SYMINGTON. You also mentioned that events were taking place so rapidly we could not afford "roadblocks to progress" in the form of traditionalism or turning our minds to the past at the expense of the future?

General, Putt, have you encountered such roadblocks?

General PUTT. I don't think of any at the moment in the Air Force.

Senator SYMINGTON. I am glad to hear that.

I am running through questions trying to save time, Mr. Chairman. Many I had have already been answered.

General Putt, you listed a number of research and development projects which had been deferred, or stretched out, because of insufficient funds being allocated to them.

Among the projects listed were—this was in your previous 1956 testimony—improved bombers, nuclear propulsion for aircraft, electronics, missiles, research aircraft, satellites, radar, chemical propulsion, basic research studies, prototypes, and new fuels.

Are there any of those in that list you would now take off as having been deferred or stretched out, because of insufficient funds being made sufficient?

General PUTT. You went through that pretty fast for me.

Senator SYMINGTON. Let's take them one by one.

Improved bombers, research and development on modern bombers?

General PUTT. We still need more funds.

Senator SYMINGTON. Nuclear propulsion for aircraft?

General PUTT. More funds.

Senator SYMINGTON. Electronics?

General PUTT. We still have deficiencies.

Senator SYMINGTON. When you say deficiencies you mean that you require more money in order to do an adequate job for our national security?

General PUTT. That is correct. There is much more that needs doing.

Senator SYMINGTON. Missiles?

General PUTT. I think the same applies.

Senator SYMINGTON. By the way, the Navaho was canceled recently after we put in something like \$690 million.

Do you believe from your experience, your personal opinion, that that was a sound move?

General PUTT. I think in the light of the availability of resources it probably was the best move to be made that we could make.

Senator SYMINGTON. In other words, if we had to cancel something, you would prefer to cancel that as against other things, is that right?

General PUTT. I think that was a sound move.

Senator SYMINGTON. Do you think the Navaho could have made a contribution?

General PUTT. I believe it could have, yes.

Senator SYMINGTON. What it really was is a supersonic Snark, is that correct?

General PUTT. In a sense, that is right.

Senator SYMINGTON. The next point was research aircraft?

General PUTT. As of right now the X-15 is proceeding with all the funds that it can use.

Senator SYMINGTON. That will be the fastest airplane in the world, will it not?

General PUTT. Yes, sir.

Senator SYMINGTON. Would you care to tell the committee in open session how fast you expect it to go?

General PUTT. The Secretary this morning said a mile per second.

Senator SYMINGTON. How much is that in miles per hour?

General PUTT. 3,600.

Senator SYMINGTON. Mr. Chairman, I believe my time is up. I would like to ask some more questions, but will defer them.

Senator STENNIS. Are there other Senators who wish to question this witness?

If not, Senator, you may proceed.

Senator SYMINGTON. Thank you, Mr. Chairman.

Satellites, do we need more money for satellites?

General PUTT. Yes, we do.

Senator SYMINGTON. Radar?

General PUTT. We can use more money on radar.

Senator SYMINGTON. When you say "we can use," you can always use more, but do you think you need more?

General PUTT. We need more.

Senator SYMINGTON. Chemical propulsion?

General PUTT. We need more there.

Senator SYMINGTON. Basic research studies?

General PUTT. We certainly need more there.

Senator SYMINGTON. Prototypes?

I will withdraw that.

That could be almost anything.

New fuels?

General PUTT. On new fuels we need more.

Senator SYMINGTON. Would you say that our failure to have this money is one of the reasons that has contributed to the present serious situation vis-a-vis the strength of the Communists?

General PUTT. I would have to agree that it is.

Senator SYMINGTON. Excuse me while I run through these questions, Mr. Chairman; but, again, counsel has done such a good job on questioning this witness that some of my questions appear redundant.

About the B-58, General Putt, do you believe the B-58 is a good airplane?

General PUTT. Yes, I do.

Senator SYMINGTON. Has the B-58 been retarded in its development?

I am not quite sure whether it is considered replacement for the 47 or for the 52—there are stories both ways—but regardless, it is the coming bomber, is it not; that we have flying at this time?

General PUTT. That is correct.

Senator SYMINGTON. And it is the first supersonic bomber, is it not?

General PUTT. That is correct.

Senator SYMINGTON. Has it been retarded in its development and/or production by a ceiling on funds?

General PUTT. During its entire development life, yes.

Senator SYMINGTON. What is your opinion of Dr. Livingston's proposal to hold weapons contractors responsible for performance, and give them technical freedom to decide how this performance can be achieved?

QUALIFIED APPROVAL

General PUTT. I agree in principle that the contractor should have as much freedom as it is possible to give him. However, this varies between different types of programs; and also, as I am sure the committee appreciates, there is a problem of standardization, and if complete freedom were given, we would lose a lot that we gain by having proper standardization.

It is a matter of degree.

Senator SYMINGTON. May I say I would be inclined, for what it is worth, to agree that Dr. Livingston has a point. Do you believe that a planning agency under civilian control, as suggested by Dr. Livingston, will place radically new weapons systems into the operational inventory faster than the present system?

General PUTT. I do not.

Senator SYMINGTON. In any case, it would create a difficult situation. You would be giving them, to some extent, control not only of the weapon itself, but of its use, would you not?

General PUTT. Well, you may not be giving him control of its use, but, in my opinion, the strength of our system in the United States, our system of developing weapons, is a real sound one, and a good one, and, as weapons become more complex, it is absolutely necessary that the user develop the operational concept, his logistic support, the ground-handling equipment, train his people, and prepare bases and installations simultaneously with the development of the weapon itself.

And, if I understand Mr. Livingston's proposal, we will develop a prototype and then demonstrate it to the services, and then, at that time, we will start worrying about the logistics, the operational employment concept, and things of that nature. To my way of thinking, this would stretch out the time between initiation of the development and the operational capability, rather than close it.

Senator SYMINGTON. General, is it not true that one of the reasons, especially to people in private industry, it appears you take more time in the military, is that, invariably, you are attempting to get performance at a weight, whereas in private industry it has been my experience you are attempting to get performance at a price?

General PUTT. That is correct.

Senator SYMINGTON. And, therefore, whereas in private industry you do not have to have many engineering changes, especially if you are tooled beyond the prototype stage, not only for safety, but also for effectiveness in battle, you constantly have to have a lot more changes in military production than you do in private-industry production; is that not correct?

General PUTT. That is correct.

Senator SYMINGTON. That is something I think often is overlooked. Finally, Dr. Holaday indicated that the principal extra cost of producing both Thor and Jupiter would be the continuation of 2 research and development programs instead of 1. Do you agree with that?

General PUTT. No, sir.

Senator SYMINGTON. Why not?

General PUTT. Well, in addition to the added costs of 2 development programs, you have the additional cost of tooling up a different production line, a somewhat different set of ground-handling equipment, the training of additional people, to handle 2 different systems. The number of parts and pieces that go into your supply system are doubled, which is a headache in itself.

So that, I think, there is considerably more than just the increased cost of two research and development programs.

Senator SYMINGTON. The Army thinks, or implied in testimony, that they felt the Jupiter was a better missile than the Thor. I presume you do not agree with that, entirely.

General PUTT. That is correct. [Laughter.]

Senator SYMINGTON. Mr. Chairman, I have no further questions.

Senator STENNIS. I thank the Senator from Missouri.

Senator BRIDGES, do you have any questions?

Senator BRIDGES. General, I noticed that you and other witnesses from time to time, when questioned by members of the committee and by counsel as to whether or not you had sufficient funds, or were asked whether you could use more, sometimes you said, "We could use more"; sometimes you said, "Well, we need more"; and sometimes you made an unqualified answer that more funds were absolutely necessary.

There is a difference between desiring more funds, being able to use more funds, and, I think, even to needing more funds, and it being absolutely essential to the security of the country that you have more funds.

I noticed that Senator Symington raised that issue at one point in his questioning, and not only you, but other representatives of the Air Force and representatives of the other services, have used different phraseology in answering questions of similar intent. Would you care to clarify that?

General PUTT. I can clear that very easily, Mr. Bridges.

Irrespective of what phraseology I happened to use, I put all of it in the category that we need it and, in my judgment, it is essential for the security of the country.

Senator BRIDGES. When you say, then, that either you could use more or that you need more, you mean that it is essential to the security of the country that you have more funds, regardless of the phraseology you used?

General PUTT. That is correct.

Senator STENNIS. General Putt, may I ask you one question? We use the term "research and development." I would like to have an idea as to what percentage the one bears to the other, on a project. I imagine there is no firm rule, but in the research do you generally count that as about one-third and the development two-thirds? Or the research one-tenth and the development nine-tenths? Could you give us a rule of thumb on that, or is there one?

General PUTT. There is one that is fairly accurate, and here it is, in the terms that Mr. Saltonstall referred to earlier: If you consider that our total research and development program is funded out of the research and development appropriation, P600 funds, and the development covered by production and procurement funds, the P100 and 200 funds, then the relationship is one-fourth in what you have referred to as research, and the other three-fourths is in—

Senator SALTONSTALL. You are high on that, are you not, General? Is it not nearer a third?

General PUTT. Well, let's see. We said—you are right; sure. Two hundred on 1 and 600 in the other. I was putting them both together.

Senator STENNIS. Well, you were correct if it was 600 plus 200, but that is arithmetic. Generally, then, your rule of thumb is that one-fourth is for research and three-fourths for development?

General PUTT. In the way that—

Senator STENNIS. Thank you. That is very helpful.

Are there any other questions?

If not, General Putt, we certainly thank you for your testimony here, which is very helpful to us and very helpful to others. We will certainly reflect on your testimony later. We want to thank you especially for your appearance now. If you will make the table available for others now.

Senator STENNIS. The next witness we have here will be Gen. Clarence S. Irvine. General Irvine is Air Force Deputy Chief of Staff for Materiel.

General Irvine, we are very glad to have you here, sir. If you will hold up your right hand.

Do you solemnly swear that your testimony here before this committee will be the truth, the whole truth, and nothing but the truth, so help you God?

General IRVINE. I do, sir.

Senator STENNIS. Have a seat.

May I insert in the record here something of your biography? I notice where you started out as a second lieutenant in the Air Corps, 1926. May I insert that in the record here, and I have already stated that you are now Deputy Chief of Staff for Materiel, and have been since May 1955.

(General Irvine's biographical statement follows:)

LT. GEN. CLARENCE S. IRVINE, UNITED STATES AIR FORCE

General Irvine is Deputy Chief of Staff (Materiel) United States Air Force. He was born in St. Paul, Nebr., December 16, 1898. Enlisting in the Air Service in November 1918, he was graduated from flying school at Kelly Field, Tex., October 15, 1921.

He received his regular commission as a second lieutenant of Air Corps on June 30, 1926. From 1930 through 1942 General Irvine held many important assignments principally at Wright Field, Ohio, the last of which was executive of the Production Division.

In January 1943, General Irvine was transferred to Army Air Force Headquarters in Washington, D. C., as assistant to the Assistant Chief of Air Staff for Aircraft Production. In September 1944 he was named chief of the Supply Division of the 20th Air Force at Washington, D. C.

In December 1944, General Irvine was deputy chief of staff for supply and maintenance of the 21st Bomber Command in the Pacific. The following October he was named assistant chief of staff for supply of the United States Army Strategic Air Forces, and 3 months later became deputy chief of staff of the Pacific Air Command. In January 1947 he was designated deputy chief of staff of the Far East Air Force.

He joined the Strategic Air Command in April 1947 as assistant to the chief of staff. In September 1948, he assumed command of the 509th Bomb Wing, SAC at Walker Air Force Base, N. Mex. In January 1950 he became commanding general of the 7th Bomb Wing at Carswell Air Force Base, Tex., assuming command of the 19th Air Division there in February 1951, and in March 1952 he was assigned to 8th Air Force Headquarters at Carswell.

Returning to Wright-Patterson Air Force Base, Ohio, in September 1952, General Irvine was deputy commander for Production of the Air Materiel Command, and 2 years later was redesignated deputy commander for Weapons Systems, Air Materiel Command.

Reassigned to Air Force Headquarters, on April 28, 1955, General Irvine was named Acting Deputy Chief of Staff for Materiel, and on May 10, 1955, was designated Deputy Chief of Staff for Materiel.

His decorations include the Distinguished Service Medal, Silver Star, Legion of Merit with 1 oak leaf cluster, Distinguished Flying Cross with 1 oak leaf cluster, the Air Medal with 1 oak leaf cluster, and the Bronze Star.

TESTIMONY OF LT. GEN. CLARENCE S. IRVINE, UNITED STATES AIR FORCE, DEPUTY CHIEF OF STAFF (MATERIEL), UNITED STATES AIR FORCE

Senator STENNIS. If there is no objection from the members of the committee and counsel, the Chair asks that Senator Symington, who has an important and pressing appointment for the evening, be permitted to question General Irvine first.

There is no objection, Senator Symington.

Senator SYMINGTON. Mr. Chairman, that is kind of you and I deeply appreciate it, but if it is in order with the Chair I would prefer to wait until counsel is through. Then if the rest of the members would yield, I would question, if that is all right.

Senator STENNIS. Whatever your preference is.

Counsel will proceed to examine General Irvine.

Senator SYMINGTON. I thank the Chair.

Mr. WEISL. General Irvine, you were in Russia with General Twinning recently; were you not?

General IRVINE. A little over a year ago; yes.

Mr. WEISL. And during your visit to Russia, did you make any observations as to the capability of the Russians?

General IRVINE. Yes; I made a number of rather intensive observations.

Mr. WEISL. Please tell the committee what those observations were.

General IRVINE. Observations were made on the background of a rather thorough briefing and understanding of the status at that time of our intelligence information. Therefore we were looking into quite specific areas where we desired additional data.

For example, in the area of engines, we were quite interested in determining the progress they were making. Frankly, we were quite disturbed to find out that in areas where we could make a direct comparison, in the preceding 3 or 4 years they had progressed at a much faster rate than we had.

For example, in copying the British Nene engine. In general, they had taken British technology and advanced at a faster rate, performance-wise than our companies.

Senator STENNIS. I am afraid we do not hear you well, General Irvine. If you will pull that close in.

General IRVINE. In the area of copying the German technology, and German engine they had not only learned the German lessons but began to write their own textbooks on what you could do in engine design.

This was the basis of our conclusions which General Putt and I thoroughly agreed. We were worried about how rapidly they were closing the technological gap between our countries. Inevitably it appeared we were going to be behind in the scientific race.

Mr. WEISL. And have you made any observations since that visit?

General IRVINE. I think everything that General Putt and I reported to Mr. Symington's committee as things that would probably happen, have happened. Our estimates that we had made as individuals and as a group have turned out to be painfully accurate.

DIVERSITY OF WEAPONS NECESSARY

Mr. WEISL. General Irvine, there has been some testimony here today that what we ought to do is concentrate on bombers and then not diffuse our concentration over bombers, satellites, and missiles. Do you agree with that observation?

General IRVINE. I think the most terrible mistake we could make in our military plans would be to place all our eggs in one basket. The minute the enemy knows you only have one method of getting at them, he can easily plan to counter that procedure. This is the fundamental reason why we have an Army, a Navy, and an Air Force, to begin with.

In the Air Force itself, we feel it necessary to have more than one solution to a military mission, to a military problem, and, of course, there is the matter of timing. Some weapons replace others, and sometimes they only supplement or complement what we have in our inventory.

We were disturbed last year because of the great skill with which the Russians avoided all questions on missiles and their efforts to keep us from finding out anything about them. A lot of Americans are inclined to say just because they did not have two cars in every garage, that they do not have any missiles either. General Putt and I felt the opposite would probably be true but, of course, we were unable to prove it.

We were certainly disturbed with the progress they had made on the things that we were able to see, get reports on, and get parts of. In our forward-looking programs, being a conservative Scotchman, I am probably somewhere in the middle of the Air Force estimate of

what we should do, but I think it is absolutely essential that we continue with manned bombers.

As a production man, it seems terribly wrong to me to permit our B-52 production line at Wichita, Kans., to close down after the fiscal 1958 procurement is delivered.

The B-58 is in my opinion one of the most superb machines that has ever been built. It has tremendous capability at high and low altitude. It is a fine companion for the B-52. It will replace our B-47 medium bombers.

It is unfortunate in the military hardware competition that we are now engaged in, that obsolescence comes so fast. I remarked to an industry president a while back that he would not be caught dead with a 10-year old Cadillac. We can't afford to be caught with 10-year-old B-47's and B-52's. We must have replacements for them, to keep our manned bomber fleet modern and efficient.

We do have a development program going forward on a chemical bomber, which is the real replacement for the B-52, a very high supersonic-high capability machine.

Those machines and their successors (the X-15 is an indication of the types of machines we are working toward to operate in the upper limits of the atmosphere) must be supplemented by other machines of very fast reaction. This is the military reason for the ballistic missile. We want a combination of solutions to the military mission.

Mr. WEISL. So that, General, you believe we should give equal priority to the bomber to see that it isn't an obsolete bomber, to the missile and to the satellite.

General IRVINE. I don't know that you can say exactly equal priority. Maybe we have to give equal management attention. In the past period, we have been giving first priority to the ICBM, because of the necessity of concentrating both funds and engineering intelligence on the program, to get it underway, to make a time schedule for operational use that we had set for ourselves.

In the meantime, under lesser priority, lesser pressure, we had people working on a new long range chemical bomber.

One of the reasons we had not placed priority on it was because the first engineering solutions were not fully satisfactory. In any event we felt the place where we were in danger of being behind was in the ballistic missile area. That is why, back in 1954, the decision was made by the Air Force to place the highest priority on the intercontinental ballistic missile.

Mr. WEISL. Perhaps I can put it another way, General.

We do know that during the Second World War, the Russians didn't have a bomber to match our bomber, don't we?

General IRVINE. Yes.

Mr. WEISL. We know that since the Second World War, they built a duplicate of the B-29.

General IRVINE. Yes.

Mr. WEISL. We know that they built a duplicate of the B-47, don't we?

General IRVINE. That is right.

Mr. WEISL. We know that they built the Bear, which is one of the longest-range bombers in existence, don't we?

General IRVINE. Yes, sir.

Mr. WEISL. We know that they built the Bison, which is the equivalent, at least, of the B-52, don't we?

General IRVINE. Approximately so; yes, sir.

Mr. WEISL. We know they were able to place a satellite weighing a thousand pounds in orbit, that means they are pretty well on their way to an intercontinental ballistic missile; don't we?

General IRVINE. They certainly have some of the major elements, propulsion, for example.

HOW FAST CAN THEY BUILD

Mr. WEISL. Now, testimony has been introduced here that they can build a war weapon or a weapons system at an average rate of twice the speed that we can build one in this country.

General IRVINE. I don't agree with that. They have in some instances. The laws of nature are the same for them as they are for us. If we have the same energy and intelligence and national willingness to sacrifice, that they have shown in that country, we could do anything they can, and better, too.

Mr. WEISL. I agree with you. But do we have—how can we get the necessary job done?

General IRVINE. It is a little difficult to really make extraordinary progress in developing military hardware, in an atmosphere of guns and butter, too.

Mr. WEISL. Let me read to you what an authority on the subject, a great scientist, has said. And see whether you agree with it.

I believe that there is adequate scientific, engineering, and technical manpower in the United States missile and satellite field. There now exists a vast technology in the United States which can be applied to agreed national objectives.

However, the administrative handling of this potential has been painfully divisive and painfully lacking in clear unified objectives. The very roster of missiles under development by the several services is prima facie evidence for the diffuseness of national effort and for the lack of concentration of this effort on primary needs.

Do you agree with that conclusion?

General IRVINE. Not fully.

Mr. WEISL. With what part do you agree? Do you agree that we have the technology?

General IRVINE. Yes, sir.

Mr. WEISL. And the science to do the job?

General IRVINE. Yes, sir.

Mr. WEISL. And do you agree that this technology and this scientific manpower is improperly handled and improperly managed and improperly administered?

General IRVINE. In essence, that is true. There are a lot of very different reasons for it. It is the end result that is the problem.

Mr. WEISL. You do not take the position we can't do what the Russians have done; do you?

General IRVINE. I have already said on the record that I think we should do better.

Mr. WEISL. But we haven't.

General IRVINE. That is right.

Mr. WEISL. Now, may I ask you, General, what obstacles have you faced in your duty in getting the IRBM and the ICBM underway?

General IRVINE. Before I answer that question specifically, I would like to go back to our 1952 position. I was out at Dayton at that time, in the Air Materiel Command, projecting our Air Force procurement and operating requirements forward. Our forward projections showed that if we were to maintain and keep modern the organization we had planned, the 137-wing Air Force, and do the other things we were talking about doing, it appeared that we would need in fiscal year 1958 about \$22 billion for the Air Force.

On top of that load was added the intercontinental ballistic missile in 1954, and the intermediate range ballistic missile in 1955.

In addition, our programs on the Sage system, the distant early warning line, and things of that kind, went forward, and each of those were expensive programs.

When you get in the position we did in fiscal year 1958, where the money which was made available to the Air Force was on the order of \$18 billion, then a lot of things fall by the wayside.

So you make difficult decisions like cancellation of the Navaho program, for example. Like General Putt, I fully realize that we don't have a key to the Treasury. All we can do in the military, is the best we can with the money that is made available to us, within the limitations imposed by the administration, on the money appropriated by the Congress.

Now, in the ICBM area, part of the problem was our inability back in the fifties to foresee that we would have a good, small thermonuclear bomb as soon as we did, and so some time was lost in that period.

But our progression in the area of the ICBM, after we really got our wheels up and went to work in 1954, I think, has been one of the most outstanding advances in engineering history.

The Air Force has not been able always to do what we would like to do. We had plans back in 1954 which envisioned an initial operating capability which was quite large.

When we analyzed the tremendous costs on the other tasks we were assigned, we were forced to reduce our missile inventory plans somewhat.

In the main, in the case of the Atlas, so far as the research and development program is concerned, this was not too serious.

I think the Atlas program has gone ahead in pretty good shape. However, we will not have, in the operational inventory, the number of missiles that it would be possible to produce and support, from our existing engineering and production base.

Now, you have that same information in the letter which I have seen from Convair. It is certainly true that we have facilities now existing to produce, without additional tooling or equipment, at least twice what we are doing, if the requirement exists and the funds are made available.

Now, the military decision, the administrative decision as to what the right numbers are, is a most difficult one, because we are talking in terms, as the Senator said earlier, of rather large dollars in these programs. Through all the testimony that we have listened to here

today from Air Force witnesses has been the indication that we would be happy if we had a little more money.

We certainly would be happy, if we, ourselves, knew how to spend what we have even more intelligently. We are constantly searching for advice from industry management and from scientific authorities to determine better ways to do our job.

For this reason, when actions are taken that cause delays, which either lose money or see it spent not too wisely, we are very disturbed.

Now, General Putt gave you examples of how you get something approved under our present system.

Mr. WEISL. General Irvine, if you will pardon the interruption, Senator Symington has a pressing engagement this evening, and I would like to yield my time to him so that he may examine you. He is far more familiar with the subject than counsel is.

Senator SYMINGTON. Mr. Chairman, I thank the counsel and I am amazed that he picked it up so quickly, but I would like to say, without reservation, I don't agree with him on that. I am amazed he has picked up his knowledge so quickly. He is versed in the subject, but, as long as the chairman and counsel have been kind about this, General, there are several questions I would ask you, and then turn you back to counsel.

First, you testified about prototypes. People who come from States like, for example, the distinguished Senator from New Hampshire and I do would be especially interested.

You said, when you went to Moscow, every program you saw, Mig-15's, Mig-17's, Mig-19's, they stepped out and built perhaps 30 to 60 for test purpose, and, in the case of the B-52, we built 13 for test programs. I asked if that figure compared to their 30 and 60 and you said "Yes."

General IRVINE. That is correct.

Senator SYMINGTON. Then I said in the 1956 hearings:

Let me ask you this:

If this is true, they are spending not only more in resources for research and development, but a great deal more than we are.

That could be the only conclusion, could it not?

And you said:

Yes, I am sure it is.

General IRVINE. That is right.

Senator SYMINGTON. That is one piece of testimony I wanted to present to the committee. And this was after your trip to Russia; correct?

General IRVINE. Correct.

Senator SYMINGTON. And then I said:

General Irvine, let me ask you this question. We have gotten into a philosophy in this country that we cannot afford to match the Communists in number. As an example, we cannot afford to match them in men, submarines, in trained engineers. Now we say we cannot afford to match them in planes.

We are constantly emphasizing that the reason we have the right to say that and establish policies accordingly is because, qualitatively, we are so far superior to them.

Then I said:

But are we so superior? What are your comments on that?

And you replied:

My comments are simply I back up General Putt that we are not very far ahead of them at the moment, that they have been closing the gap over the last 15 years, and so I can only come to one conclusion. In such areas as ballistic missiles—this is in 1956 you are testifying—

nuclear bombers, chemical bombers, long-range interceptors, we must do everything we can in marshaling people and resources into expanding those programs to the fullest.

I believe your testimony is that, since you so testified in 1956, we have not done everything we could; is that correct?

General IRVINE. No; we certainly have not.

Senator SYMINGTON. Then I said:

Based on the testimony you have given us this afternoon and on General Putt's testimony, might they even now be ahead of us in those fields?

You replied:

I think it is possible they might be, because of some things General Putt and I both observed in Russia and how they showed up when they are dealing with some of our scientists at some of the scientific meetings which they appear to be as good in some areas, possibly better in the very fundamental things of electronics and metallurgy.

You said:

They are not as good as we are in production engineering.

General IRVINE. That is right.

Senator SYMINGTON. Is that still your feeling in this matter?

General IRVINE. Yes; I think their incapability to produce pounds of airframe or pounds of trucks, they are still not as efficient in manufacturing as we are, but, as to their capability in science and in basic and applied engineering, they are writing their own books on the subject now.

Senator SYMINGTON. General Irvine, everybody knows that you are considered the No. 1 production man, the No. 1 shopman in the Air Force. I would like to ask several questions with respect to conclusions we reached after listening to your 1956 testimony conclusions in the majority report.

Conclusion 7 was:

The United States has the capacity to produce an adequate number of jet tankers, but has failed completely to do so, nor has it any adequate program to overcome that deficiency. This neglect has seriously decreased the effectiveness of our airpower.

Do you believe that is still correct in December 1957?

General IRVINE. Actually, we have been producing tankers to meet a requirement to refuel the B-52 airplane. We did not get started on the jet tanker at the same time we did the airplane. So, that program has been behind the B-52 requirement. We did not provision jet tankers for any airplanes other than the B-52; for example, the tactical fighters.

Senator SYMINGTON. And that policy has considerably reduce the effectiveness of SAC, has it not?

General IRVINE. It has reduced its effectiveness over what it could have been; yes.

Senator SYMINGTON. If you had produced the tankers for all the planes that need refueling instead of only a few, would that be a fair statement?

General IRVINE. That is correct.

Senator SYMINGTON. Conclusion 16 was:

The Soviets exceed the United States in rate of technological development in training facilities in speed and quantity of prototype development, in the training of scientists and engineers, and in many other phases of airpower development.

I would like to go over that again with you because this seems vital to me.

The Soviets exceed the United States in rate of technological development.

Do you agree to that in December 1957?

General IRVINE. Yes, their training methods, you are talking about training people now, is certainly superior to ours.

Senator SYMINGTON. One thing you talked about a great deal about in the 1956 hearings was education. You would still agree, would you not, that in training facilities they are exceeding us?

General IRVINE. Yes, the amount of materiel, equipment and instructor personnel they are willing to devote to education.

Senator SYMINGTON. In speed and quantity of prototype development?

General IRVINE. We have since that time done better in the area of buying enough airplanes to have a really good test program.

Senator SYMINGTON. So in that category we have improved our position?

General IRVINE. Yes, sir.

Senator SYMINGTON. In the training of scientists and engineers?

General IRVINE. No, I don't think we are now doing as well as we were at that time. We are talking more about it, but I don't think we are doing very much about it.

Senator SYMINGTON. Now the final point, item 21, in our 1956 conclusions was:

The United States has the capacity to produce and maintain airpower which is relatively stronger than that of the Soviets, but the Department of Defense has not utilized that capacity.

Would you agree with that statement?

General IRVINE. Well, I said at that time that we could build considerably greater numbers of airplanes that we are building in the facilities we have tooled up.

That was true then and is true now.

I said, before, it is not up to the military, to determine how much money we get, to do our job. We can come up with what we think are our essential requirements, present them to the Department of Defense and to the Congress.

Senator SYMINGTON. You have heard the testimony of General LeMay with respect to SAC and the growing danger,

Would you agree, based on your experience?

General IRVINE. There is no question that the threat, their ability to hit us, the status of training of the Russian Air Force, has all steadily improved in the last year and a half. As I said a while ago in answer to questions by counsel, I feel it would be very wrong to let the B-52 production line go down.

Senator SYMINGTON. Mr. Chairman—

Senator SALTONSTALL. Would you repeat that question, Senator?

Senator STENNIS. Repeat that statement for the Senator, will you please, General?

General IRVINE. I said that I thought it was wrong in view of the growing Russian threat, their increasing capability not only in planes but in trained personnel, the status of training programs, the kind of flying they are doing, their demonstrated ability to do their job, to take any pressure off the training of our crews or the modernization of our equipment. As a part of that, I feel it is wrong to let our B-52 production line go down after this year's order.

CUTS HAVE NOT BEEN REPLACED

Senator SYMINGTON. I have one final question, General, that I have asked many other witnesses. You are probably at least as closely connected with the production schedules of airplanes and also with maintenance and operation funds, and what is done with them. You know much about research and development.

Now, with the exception of missiles—and I emphasize ballistic missiles—and with the exception of the replacement in November of a planned 10 percent cut in research and development figures that was announced in August, do you know of any procurement schedules, production schedules, maintenance and operations money, in personnel training funds, or research and development where the reductions made since January 1, 1957, have been replaced?

General IRVINE. I do not.

Senator SYMINGTON. Mr. Chairman, may I thank the counsel for his courtesy in letting me question the witness. May I say that I have been around the Senate some years and have never seen anybody grasp the problem at hand, in more able fashion than the distinguished gentleman from New York and his assistant; and I look forward to the pleasure of working with and for him after the committee reconvenes.

I express regret, Mr. Chairman, that I have to leave, and look forward to questioning General Schriever and the other witnesses when they come before the committee in executive session.

May I also thank you and the other members of the committee for your kindness in letting me question out of order.

Senator STENNIS. I thank the Senator from Missouri.

Counsel may resume his examination.

Mr. WEISL. General Irvine, you know, of course, about the decision to manufacture both the Thor and the Jupiter?

General IRVINE. Yes, sir.

Mr. WEISL. Do you think there is any substantial difference from an operational standpoint between the Thor and the Jupiter?

General IRVINE. They are about as alike as the Ford and the Chevrolet.

Mr. WEISL. Do you think the Jupiter is the backup for the Thor?

General IRVINE. No, not to any real engineering degree. The laws of nature are the same for the Army and the Air Force, and they have equally skilled people working on the job, except in this area I think the Air Force got started sooner with a more thorough understanding of what we are trying to do. And that was not just to build

a missile, but to build a weapons system with a complete ground environment including the trained people, the operational and logistics concepts, the fitting of this weapons system into the overall SAC war plan, this last probably being the most important of all.

Mr. WEISL. Has the Air Force sufficient facilities to manufacture as many Thors as can possibly be needed in the foreseeable future?

General IRVINE. We are in the interesting position, on this as we are in many other weapons systems, of being able to build more than we could justify, to meet military requirements, or that we think the country ought to buy.

Mr. WEISL. Since the Air Force will be charged with the responsibility of operating both the Thor and Jupiter, do you as an expert feel that you need both the Thor and the Jupiter?

General IRVINE. This is a question of buying insurance. This to me is the difference between the 65-year old man buying insurance to send his kid through school or buying insurance on the child. I mean you can pay a high price for insurance if you buy the wrong kind.

If this were a missile which had an advanced engine, an advanced airframe——

Mr. WEISL. If you will pardon the interruption and will forgive me, does this have an advanced airframe? Does this have a different engine? Does this have a different propulsion?

General IRVINE. It has the same engine, an Air Force-developed engine built by North American, with somewhat different installation devices, but relatively the same installation procedures. Actually the facts of life in this case, are that the accent on the development of the Jupiter, has been toward developing a missile, not a complete weapons system. And this is perfectly understandable, because the people who are working on it did not have the entire environment and were not the people that had the problem of solving the entire military problem.

Therefore, the ground environment and the operational concept and many other things are not what it takes to do the job, they do not quite fit. So that this to me—and if you have some Fords coming out—this is like starting some Chevrolets, too. To meet our requirements it is going to be late, certainly after the middle of next year before a missile that has all the apparent requirements in it to meet the Air Force mission——

Mr. WEISL. You are talking now of an intermediate missile?

General IRVINE. Yes, I am talking about the IRBM. In other words, they have been flying experimental and prototype missile and the work that has been done on them has been fine. The difference between that and the Air Force concept, is that new and modern high-performance airplanes we build on so-called hard tooling, and we build enough of them so we have a production run.

The Thor, built by Douglas, with Air Force thinking behind it was built on production tooling. So if you get a good one, we are in a position to go ahead and build a lot of them.

Mr. WEISL. You have got a good one in your opinion in the Thor, have you not?

General IRVINE. Yes, sir.

AIR FORCE DOES NOT NEED THE JUPITER

Mr. WEISL. And you are in a position to build as many of them as the Air Force can possibly use in the foreseeable future?

General IRVINE. More.

Mr. WEISL. Do you need the Jupiter?

General IRVINE. No.

Mr. WEISL. You do not?

General IRVINE. No.

Mr. WEISL. Have you been restricted in the number of Thor test vehicles that you could develop?

General IRVINE. Yes, we were restricted, I believe it was on the 13th of August, to roughly half the rate we were going to at that time, and to a third of the rate we intended to go to.

Mr. WEISL. Has this restriction of one-half or one-third, slowed the development of the Thor missile?

General IRVINE. General Schriever is in a better position than I am to answer that precisely, but it is my understanding from my observations at Patrick that this limited the number of equipments that are available for the test program. But more important than that was the delay in authorization to buy the ground environment. This is very serious, because in the airplane business we thought of maybe 15 percent of the total cost of the system being in the ground environment. In these missiles it is nearer 60 percent, so that if you delay the ground environment, there is not much use in building the missile.

In this case, the delay in ordering the ground environment inevitably delays the operational deployment of the weapon.

Mr. WEISL. How long does it take to build the ground environment, General Irvine?

General IRVINE. The great majority of it has a lead time of about a year from contract, but there are some items in it that are 16 or 17 months.

Mr. WEISL. If you plan to have the missile in operation to some extent by the middle of next year, will you have the ground environment to implement it?

General IRVINE. We have already ordered for service test purposes roughly three sets of ground environments which we intend to use for service test purposes, so that we are quite able to make the deployment dates for that reason.

Mr. WEISL. Can you turn the test equipment into the actual ground environment?

General IRVINE. Yes. It will not meet all our desired factors but by the time we set for the deployment of the first unit, we will have it suitable for operations.

Mr. WEISL. Have you selected the launching sites for these intermediate missiles?

General IRVINE. The Air Force has given a preferred list of where we would put them if we made a military decision.

Mr. WEISL. When you get permission to put them there, how long does it take you to build the launching apparatus?

General IRVINE. I think to go in on a movable basis, which is what we would probably do at the first location in any event, probably 8 months.

Mr. WEISL. Eight months?

General IRVINE. To be fully operational.

Mr. WEISL. How long will it take you to train the crews to man these missiles?

General IRVINE. Many of these people are already being trained. We have people in training now.

Mr. WEISL. How long will it be before you can man the four squadrons that are planned for 1958?

General IRVINE. This is no problem.

Mr. WEISL. No problem?

General IRVINE. No.

Mr. WEISL. Very good.

General IRVINE. It means that like everything else in life, you have to take some sacrifices. We are going to pull people out of our fighter-bomber and tactical-bomber and heavy-bomber units if need be.

MOBILITY OF IRBM

Mr. WEISL. General Irvine, you undoubtedly have either heard of or read the testimony of General Gavin and General Medaris concerning the mobility of the IRBM. Do you agree with their views as to mobility?

Let me put it another way. You do agree that mobility is desirable; do you not?

General IRVINE. We had an inspection by our Air Force Secretary and Secretary Brucker of the Army out on the west coast, a development engineering inspection of the ground handling equipment for the Thor. All the equipment was in place. The real material, not pictures, not ideas, but the material that would be used was set up in place and demonstrated. And this equipment is on wheels, and we are in a position to put this stuff on trucks and drive it around the country if that seems like a good idea.

However, when you start talking about that sort of thing where you are going to move a truck train of 150 or 160 trucks around the country, I think some people ought to take a look at some World War II pictures of what you could do to a bunch of trucks on the road with a bunch of fighters, and the Russians have lots of fighters.

Mr. WEISL. You heard of or read the testimony of General Medaris, I believe, who said that this equipment is just as easy to move as an 8-inch gun.

General IRVINE. I have never experienced moving 8-inch guns, but I think the best answer to that question is, we design our ground support materiel so that we can drive it around and set it up and tear it down and move it. We have five different plans, which go from a completely mobile solution, to where we would have a large number of fixed sites, some unoccupied, maybe some we would not use at all in time of peace, that we could move to. We have our equipment on wheels, so we are flexible—either fully mobile or temporarily fixed.

From that through various gradations to a hardened site where there would be nothing for the enemy to look at, till we decide to bring the equipment out, shove the missile on a launcher and shoot it.

So we have those five different variations, and we feel they are necessary, for relatively thinly populated areas where the deployment

plans could be carried out, to heavily populated areas. Anybody who has driven around some of the narrow roads in England, the idea of moving a 25-ton truck along, sounds a little sporty.

Should we decide to put this equipment in a place like Alaska, there it seems sort of sensible to dig in.

Mr. WEISL. Well, General Gavin testified that in his opinion, based on his long experience in moving heavy army vehicles or heavy army equipment, that with prearranged and with preprepared sites, their equipment could be moved in from 2 to 4 hours.

I know you don't agree with that, General Irvine, but since the Air Force will be charged with the responsibility for operating these missiles, don't you think you and the Air Force or the Air Force and the Army ought to get together and exchange views on this problem to see if you cannot get the benefit of their experience in moving vehicles.

General IRVINE. We have been getting together with them, and of course I would like to bring up one point. I think I have been in the Army longer than Gavin has. [Laughter.] In the first place, I have had some experience with moving things around, having worked for General LeMay overseas twice, and it is a pretty interesting experience.

Mr. WEISL. I would think so.

General IRVINE. In the Air Force, we have some pretty big chunks we move around, and we think we know something about them.

The laws of nature are the same for everybody; whether it is an Army truck or an Air Force truck, it sinks in the sand just the same.

If you set up a hundred-thousand-pound missile, we have the idea that maybe you ought to lay out a little piece of concrete about 20 feet square to put it on.

Mr. WEISL. I don't know a thing about it. All I am suggesting is that you get together with the Army and see if you can't work out a plan where each of you can get the benefit of the experience of the other.

Now, General Irvine, what bottlenecks can you tell the committee are present which impede or obstruct the acceleration of the development of ballistic missiles?

General IRVINE. As I told you, on the Atlas, the program, I think, is pretty well on schedule. There it is really a question, at this point, of time and quantity. Maybe we could accelerate our test program a little with a little more money in key spots.

The real question is how many do we want? We need to make that decision fairly soon so that proper production and site preparation plans can be made.

In the case of the Titan, we are running essentially a development program. We are not quite ready for the production order yet. Since that is a real backup in that it is considerable improvement over the Atlas, I think we would be better off if we accelerated that weapons system.

Again, in the case of the existing Thor and Jupiter, there is the question of getting authority for sites and really making a determination of the ultimate requirements that are necessary.

Whether we buy insurance there, again, or not, is a decision of the Department of Defense and Mr. Holaday. I do not agree with his decision, and—

Mr. WEISL. You were not consulted, either, were you?

General IRVINE. No, I was not.

However, I learned about 50 years ago from my Scotch father how to take orders, and I have orders and am carrying them out. But I would like to say one more thing about the real fundamental difference of opinion about the handling of these two missiles, the difference between Irvine and Gavin.

Gavin is thinking in terms of equipment, quite properly, to chaperon an army in the field, as an extension of artillery. And with this concept there is nothing wrong with what he proposes to do.

Our philosophy with these missiles, from the very beginning, was to create another weapons system which would fit into the SAC war plan; and therefore, among other things, we wanted fast reaction, the ability to shoot quickly, the same as in SAC we want an alert system to get the airplanes in the air quickly, while the people who fly them are still alive; and in the case of the missiles, while there is still a man there to push the button.

This is the real difference in philosophy.

Mr. WEISL. Are there any other obstacles?

General IRVINE. In the missile, the ballistic missile area, I do not think that there is a sufficient awareness, outside of the long-haired types like General Puft and myself, that the ballistic missile is only a short step in the evolution of advanced weapons systems, that we feel out of the missile program come things like a ballistically boosted manned machine, whether this is made as an air vehicle which will not quite go in orbit, or whether it is a true orbital type combat weapon.

There is too much feeling, I think, in the minds of people in this country and in Government, that we air staff folks are perhaps just a little bit crazy when we talk about these modern machines. As far as I am concerned, I have been accustomed to this, having been in engineering a long time. I think this is a very high compliment, when a lot of people in this country, think the Air Force is trying to go too far and too fast.

Mr. WEISL. Well, according to General LeMay, we neither have gone too far nor too fast. Do you agree with General LeMay's testimony?

General IRVINE. I do.

Mr. WEISL. Mr. Chairman, those are all the questions I have. My time is up.

Senator STENNIS. Senator Bridges? He is in the hall.

Senator Saltonstall?

Senator SALTONSTALL. General Irvine, I have listened to you with great interest again.

I would just like to ask you 1 or 2 questions.

The B-58 is to take the place of the B-47; is that right?

General IRVINE. Yes, sir.

Actually, rangewise, it is slightly better than the B-47.

Senator SALTONSTALL. The what?

General IRVINE. Rangewise, it is slightly better than the B-47.

Senator SALTONSTALL. It is not to supplant the B-52?

General IRVINE. No.

Senator SALTONSTALL. Are the B-58's in the production line now?

General IRVINE. No. We have ordered or are in the process of

ordering the second half or the last half, really, of the flight-test quantity.

Senator SALTONSTALL. I did not get that.

General IRVINE. As I said earlier when Senator Symington was questioning me, there are some things we are doing right. In this case, we are ordering enough test airplanes so we can get the flight tests completed earlier, and this is as far as we are going this fiscal year. Next year we would begin to buy the production quantity.

Senator SALTONSTALL. Do I state the problem correctly when I say that the great problem today with the Air Force, also with the other services, but particularly with the Air Force, is to balance the present need without building too big an inventory which would prevent taking advantage of future improvements?

General IRVINE. Yes, sir. We are long past the time when we buy a thousand of anything. We think in terms of hundreds of airplanes or hundreds of missiles. So it is not the World War philosophy of where we bought 50,000.

Senator SALTONSTALL. That philosophy is the correct philosophy; is it not?

General IRVINE. Yes, sir.

Senator SALTONSTALL. And as a good production man, you agree with it?

NO PROTOTYPES—LESS EXPENSE

General IRVINE. This is the hard way to do it, productionwise, but to be sensible, we have to agree. The rate of obsolescence is so high that we have to learn how to build things with reasonable economy and in smaller lots. The first thing you do in our modern concept is build the test quantity of missiles or airplanes on production tooling. If you do it the old-fashioned way, if you build two of the airplanes as prototypes on soft tooling, and then build production tooling after that, you cannot afford the time you lose or the money it costs.

Senator SALTONSTALL. Now, on that theory, or on that philosophy, you believe we should build up a bigger inventory or at a faster rate of B-52's than we are now building them?

General IRVINE. I do not—I am not in complete agreement with General LeMay here. I think that our present program that we have going now is a good one, because we have reduced the rate, partly to keep down expenditures and partly because this enabled us to increase the number of advanced and improved longer range airplanes within the approved quantity.

When the present order runs out, we should buy a few more to keep the line alive.

Senator SALTONSTALL. In other words, we should keep them rolling along, keep them coming along.

General IRVINE. Yes, sir.

Senator SALTONSTALL. For our present needs.

General IRVINE. Yes, sir.

Senator SALTONSTALL. One thing that interests me, something that you said, we did not go ahead in 1952 with this IRBM because we could not see the warhead.

General IRVINE. Yes, sir.

Senator SALTONSTALL. And we saw the warhead in 1955.

General IRVINE. 1954.

Senator SALTONSTALL. 1954?

General IRVINE. Yes, sir.

Senator SALTONSTALL. And then we went ahead.

General IRVINE. Yes, sir.

Senator SALTONSTALL. Dr. Teller told us, if I remember correctly, the reasons the Russians were ahead of us on the ICBM, they went ahead with the thrust without knowing what warhead they put on it. That, I guess, is a statement——

General IRVINE. That is quite accurate, Senator.

Senator SALTONSTALL. Now, what you did, what the Air Force has done, with the Thor, is really to go ahead a little bit on that principle; is it not?

You went ahead developing the thrust before you were sure what you were going to get out of it.

General IRVINE. No. The Thor was from a production engineering viewpoint, a very easy problem. We produced the first one in 13 months from the start of the contract, because we used basic components already in work for the ICBM. And General Schriever can tell you better than I, the engine, the guidance system, the nose cone were all parts engineered for the ICBM, and this is why we are so sure that productionwise the Thor is no problem.

Senator SALTONSTALL. You are thoroughly sold on the Thor as opposed to the Jupiter?

General IRVINE. Well, my basic reason is that it is a better production job.

Senator SALTONSTALL. Well, it is easier to produce.

General IRVINE. Yes.

Senator SALTONSTALL. And you are further ahead on the production is what I was trying to bring out.

General IRVINE. Well, I would say as compared to the proposed tooling at the Ballistic Missile Agency at Huntsville, and what I saw at Detroit, it's a question of whether our contractor, Douglas, is 9 months or 12 months ahead.

Senator SALTONSTALL. May I ask you just one more question: We have heard a lot of testimony in the prior sessions about the directive that Mr. McElroy has given, creating one authority on missiles, giving all his authority to one man, Mr. Holaday.

In your opinion, is that helping? Or if it has not begun to show yet, will it help? Is it a step in the right direction?

General IRVINE. Of course, any time you make a change in organization it does more harm than good for a while. Because of the inevitable confusion among the working people about where you go for a decision. And sometimes among the management people.

My personal feeling is that we could improve the decision-making process, besides saving the taxpayers a lot of money, which seems important, if we would cut down the Department of Defense about 50 percent and each one of the departments in Washington by the same degree, and send the people out to work, so there wouldn't be so many folks in the Pentagon to write letters to each other. [Laughter.]

Senator SALTONSTALL. General, that is one statement I thoroughly understand.

In other words, you think there are still too many people involved in making decisions before they get down the line to you to produce the material.

General IRVINE. Well, I feel very strongly, and I think along with my Army and Navy counterparts, that the people who have the job of creating the equipment must be in on determination of requirements, and must work closely with the people who are going to solve those requirements.

Across the years in our Air Force efforts to do a better job, to cut down the time to create a new weapons system, we have gone to the point where in the very beginning we set up a team, a four-way management team, which consists of the research and development man, the production man, the tactical man, and the contractor we select to do the job.

We sit down with the contractor and we tell him everything we know in our three specialty areas, and on top of it, given him intelligence briefings on what the threat is, that he is supposed to counter with the weapon system.

This, to me, is the best way to get something at a reasonable price in a reasonable time. There has been in my opinion too much conversation about rivalry between the services.

I think it is real healthy to have competition, and any service or any industrial company that can't stand up to competition, maybe they ought to get a new charter.

Senator SALTONSTALL. Just one final question: Are there too many committees in the Pentagon advising you?

General IRVINE. There are too many people in on the act. The trouble with committees, they sort of grow like weeds on the side of a road. Committees properly organized can be helpful in an advisory capacity, but one man must have the authority at each level.

Senator SALTONSTALL. Thank you, Mr. Chairman.

And thank you, General Irvine.

Senator STENNIS. Senator Bridges.

Senator BRIDGES. General, do you believe that we have repeatedly underestimated the Russian technical progress in evaluating our intelligence information over the years?

General IRVINE. On a national basis, I think this is true. I am very happy to tell you, Senator Bridges, that the Air Force estimates that were made on things in the past, like the Mig-15 and its performance, its productibility, were so good that I wondered if our young colonel had not been in a Mig plant.

And, of course, our national-intelligence estimates are based the opinions of the three services, each specializing in those things that they are interested in, and so I think the Air Force estimates on airplanes and missiles are probably the best, the Navy's estimates and the Army's in their particular areas are probably the best.

Senator BRIDGES. Earlier today, I think, the question was addressed to one of the Air Force spokesmen by Senator Symington to the effect that the Russian Bison bomber was either better than, or as good as, our B-52 bomber. I have always understood from the testimony that the B-52 was probably superior to their Bison.

General IRVINE. The B-52 is a better airplane, by every yardstick.

Unfortunately, in this case, the Bison is a good enough truck with a good enough bombing system to drop a bomb on the target; not with the range, nor the altitude, nor the speed or the accuracy of the B-52, but good enough.

Senator BRIDGES. But the B-52 is a better airplane?

General IRVINE. Yes, sir.

Senator BRIDGES. In your judgment?

General IRVINE. Yes, sir. No question about it.

Senator BRIDGES. The Bison will do the work, but it is not comparable to the B-52?

General IRVINE. I think, if we put them up against the same problem, there would be a wide difference in capability.

Senator BRIDGES. Were you surprised, General Irvine, that the Russians launched the two sputniks when they did?

General IRVINE. To be completely honest, I hadn't thought particularly about it beyond some rumors we had going around that they were working on such a thing. And, of course, we had been following quite closely, to the best of our ability, what they had been doing in missiles, and, certainly, in if they have the capability to launch an intercontinental missile you have one of the essentials of putting up a satellite.

Senator BRIDGES. Yes. General, Secretary Douglas testified that you started work on the Thor in 1954.

General IRVINE. Fifty-five.

Senator BRIDGES. Fifty-five?

General IRVINE. Yes, sir.

Senator BRIDGES. And you expect to have certain units in operation by the end of 1958?

General IRVINE. About a year from now; yes, sir.

Senator BRIDGES. Have you figured the approximate cost of producing both the Thor and the Jupiter?

General IRVINE. Yes; I have figures on almost every conceivable combination. And the trouble here is that there are three costs that you must consider.

First, in the missile area, the development costs are quite large, are quite high, because you have to buy a number of missiles of the final configuration, and so, there, you are talking in the order of \$100 or \$200 million. I mean this gets right expensive.

Second, in the matter of production, of tooling up not only for the missile airframe, which is the small end of this job, but the tooling up of the ancillary plants for the guidance system, nose cone, propulsion, and so forth.

Third, the 60 percent of the job, the ground-handling equipment, all the specialized truck installations and supporting equipments that must be created.

SEES BETTER USES FOR THE JUPITER PRODUCTION MONEY

These units are all being bought by the Air Force for the Thor program. The reason I feel strongly about it, as a production man, is that it means to me, one way or the other, that some hundreds of millions of dollars are being used to buy insurance of a sort. I would like to see this money spent on, very simply, the sort of thing that

Don Putt was talking about, to accelerate our radar for early warning of ballistic missiles; to get going on the antimissile missile, the manned satellite; to get on with the X-15, to really accelerate that program; to push the new chemical long-range bomber.

There are 3 or 4 places where you can put this kind of money and really do something worthwhile with it.

Senator BRIDGES. General, the questions which this committee seeks to have answered are: (1) Are we behind the Russians in certain phases of our military development; (2) why are we behind the Russians, if we are; (3) what can we do to catch up; and (4) what will provide adequate security for the country in terms of men and equipment? You have commented on some of these in the past. Do you have anything you wish to add on these general subjects?

General IRVINE. I think this country is learning surely but slowly. We certainly have established, since Korea, at least, the greatest defense posture in the history of our Nation.

We have continued, as we always have in the past, as Americans, to underestimate our opposition. We always get a little smug, and I think we have had an attack of that for the last year as a Nation.

I am not talking about any individuals at all. The thing is that many of the military folks have been making speeches about Russian progress, but apparently nobody listens much, but in this whole area Russia has been moving forward on her own.

It was obvious to us a year and a half ago. It has been pretty well proven to us in the nuclear bomb, the hydrogen bomb, and sputnik that these people learned a great deal from their German scientists, the same as those people were very helpful to us.

But they are able to go ahead as we did in engine designing. Our North American Co. took the rocket engine and improved the engine immeasurably beyond the German designs.

The Russians have done the same sort of thing; so, we are playing a game now where the other player is pretty good, too, and we just have to recognize it and train for the game, if we don't want to lose it.

Senator STENNIS. Senator Bush?

Senator BUSH. General, nice to see you here, sir.

You mentioned back about half an hour ago or so, in answer to some questions, that we really have the capacity or the capability of doing things better than the Russians, but we just have not been doing it lately.

I don't want to try to put the words in your mouth but I want to try to get the thought back in your mind.

You said we can do it better, and that was the general thought that I want to come back to and see if you would be willing to amplify on that.

Now why is it that we can do it better and we are not doing it better?

Do we lack a sense of urgency?

Is the prospect of further effort that might involve some further sacrifices on our part distasteful to the people to the extent that we don't seem willing to meet the thing?

Why is it that you said that, and would you care to expand on it a bit?

I think this is a very serious matter.

General IRVINE. This is really the nub of the problem. I think I was touching on it a moment ago when I said I felt that we underestimated our opposition too often. We have not really had the sense of urgency, as a nation, and this goes right across our entire structure, military and civilian.

The tendency at the time of a difficult financial decision to postpone creating a new system until next year, the desire to not increase the national debt, those all are manifestations.

Senator BUSH. Or taxes?

General IRVINE. That philosophy. But where it is really serious in my mind in the hands of our military and civilian engineers and scientists, those are the people who must have the sense of urgency or the solution is not created to begin with.

In the minds of the great production people of this country, the sense of urgency is difficult to create.

I saw an example of that the other day when I saw the president of General Motors down at Patrick and he saw a Thor fly that had a GM guidance system in it.

What it did to that man was unbelievable. We need to inform more of our great industrial leaders.

We have an educational job to convince ourselves and the rest of the people that we are in trouble, and we have got to work our way out of it with sweat and money.

Senator BUSH. I think that is right. I have to confess that I don't believe that we, the people, so to speak, have been thoroughly enough indoctrinated with the dangers that we face, and I venture to say that the launching of this satellite by the Russians has done more to alert us as a people to the potential that we face in an enemy than anything that has ever happened in this whole business, I mean over a period of 12 or 15 years.

Nothing has done for us in that sense what this sputnik launching has done; don't you agree with that?

General IRVINE. Yes. Of course it does not indicate they have a perfected intercontinental ballistic missile at all but it does indicate a very great scientific and engineering capability which they have chosen to apply to this area.

Senator BUSH. It also seems to me to bring home the realization that these people really do have missiles.

I mean I think a great deal of doubt has existed amongst our people as a whole as to whether the Russians really have things, because we have been led to believe that they are great propagandists, that they say these things and sometimes they are not true, and I have often wondered myself whether they really had a missile.

When they said they fired a 5,000 mile missile, I wondered whether it was true, but now I am convinced that that was true, a lot of other things they said were true, just because of what has happened, and I think that has been true with an awful lot of our citizens.

When you were over there, were you able to estimate the work schedule that they put into their factories, for instance, on these missiles?

Did you get into that with them, what sort of a work week did they have for their people?

SCHOOL WEEK 6 DAYS OF 10 HOURS

General IRVINE. To begin with, their educational program ran on a 6-day-a-week basis.

Senator BUSH. Their educational program?

General IRVINE. Their kids went to school 6 days a week.

Senator BUSH. That is in the school?

General IRVINE. Yes, sir.

Senator BUSH. Elementary?

General IRVINE. All the schools.

Senator BUSH. Secondary?

General IRVINE. From top to bottom. Their people work 6 days a week.

Senator BUSH. Six days a week?

General IRVINE. And as a general thing they appeared to be working at that time on agricultural machinery and aircraft stuff on the order of about 10 hours a day.

Senator BUSH. So that when you say we can do it better do you mean that if we were willing to extend ourselves further, then we could it better?

Is that what you are trying to say, or is that you meant, General?

General IRVINE. Well, part of the problem means the diversion of some of our gross national product, a greater proportion of it, to military type engineering, military hardware. This is not the total loss that a lot of people think it is, because every Air Force bomber has wound up with its transport counterpart, and so the things that are learned in the development of the nuclear bomb or high-performance bomber or ballistic missile can pay very great dividends back to the people of the country.

Senator BUSH. So you feel that part of the answer would be a willingness to apply a greater section of our gross national product to this military development overall, and that indirectly we would get some civilian benefits out of it along the line perhaps later?

General IRVINE. Well, it would be our own people that would be working at it and getting it, true.

Senator BUSH. That is true. I was thinking of the developments that you mentioned. I think that is all I have, Senator.

I would like to call the Chair's attention that we have been here all afternoon without a recess.

Do you think we ought to have one?

Senator STENNIS. Yes, perhaps we will be through with this witness in just a minute.

Senator Barrett?

Senator BARRETT. General Irvine, I have enjoyed your testimony. I have not been here all the time you have been on the stand, but I am curious about this item of the cost of these missiles.

You said that about 60 percent, as I recollect, of the overall cost of the missiles is in the facility for launching and so on?

General IRVINE. Yes, sir; support.

Senator BARRETT. Would not that be cut down considerably if a larger number of missiles were used on the same base?

General IRVINE. Well, it depends on the concept of what your—

Senator BARRETT. I will tell you what I have in mind.

General IRVINE. Whether you are going to reload or not.

Senator BARRETT. What I have in mind about the matter, General, is this: When you get into the intercontinental ballistic missile field, it seems to me there is no great advantage in having several sites because you could send them from one location to any point where you wanted them to land on a potential enemy.

General IRVINE. Yes. This just depends on how many guns you want to shoot at once. Here I think it is important, we feel it is in the Air Force, that you shoot a considerable number of missiles in the first wave, so to speak, so you take out the enemy's bombers and his ability to hit back at you, or if he has hit first, to stop him as quickly as possible.

So our missile arrangements, if we put up 1 launcher, 1 missile, and then fill in with some other number behind that as we harden bases.

Senator BARRETT. If you had one base or installation, you could have any number of launching installations?

General IRVINE. Oh, yes.

Senator BARRETT. So that you could, instead of firing off 15 or 20 missiles at practically the same time, fire off 50 or 75 if you desired, could you not?

General IRVINE. That is right.

Mr. WEISL. Are you sure of that, General, that you could fire at one time 50 or 75 missiles from one launching base?

General IRVINE. Well, you could only fire 1 missile at 1 time from 1 launcher.

Mr. WEISL. He is talking about a base.

General IRVINE. However, I would like to tell you a little bit, sir, about what a base might look like in our thinking.

First, since these machines have nuclear warheads, we wish to keep them separated some reasonable distance, or underground so they are in effect separated, so that the only thing that looks like a base, in this setup in our old-fashioned thinking, is the support base where you have a landing field where you bring in the material, assemble it, handle it, store it and care for the people.

Senator BARRETT. That is what I understood: that the launching sites that might surround a base could be any number.

General IRVINE. Oh, yes.

Senator BARRETT. That would, of course, cut down the cost of the overall matter because you are using a common base. General, the breakthrough on thermonuclear energy in 1953 was really the starting point for the building of the Thor and the Atlas, was it not?

General IRVINE. That was the beginning of the ICBM.

Senator BARRETT. Really, there has not been any tremendous slow-down when you take that into consideration, has there?

General IRVINE. No. I think that engineeringwise this program has gone forward quite well.

Senator BARRETT. When you say that the Russians went ahead with the engines, notwithstanding the fact that they did not know they were going to have any hydrogen bombs, did we not do about the same thing in this country?

General IRVINE. No, we really did not. That period in time we were trying to get a great many things started, and in this area the problem of using either air-breathing or ballistic missiles was studied very

carefully, and the decision was made at that point in time to go for weapons like the Snark and the Navaho because they could carry a larger warhead.

Senator BARRETT. Was not considerable work done on the Navaho that has been very useful as far as the ballistic missiles are concerned?

General IRVINE. The ballistic missile program we had, would have been impossible in time, if it had not been for the fact that we developed the Navaho engines, and used those on the ballistic missile program. There have been a great many other very real payoffs.

Senator BARRETT. It seems to me that ought to just about even up the score so far as the Russians are concerned.

General IRVINE. This may be true.

Senator BARRETT. There is one other thing I would like to ask you, General Irvine. Dr. Livingston here yesterday afternoon—I do not know whether you were here or not—said that the Russians were far superior to us so far as production is concerned. Is there anything to that?

General IRVINE. I hate to disagree with Mr. Livingston, but from what I have seen, if you define this on the old-fashioned scotch basis of what one man can produce in dollars or pounds of product, I will bet my own money that we are better than they are.

Senator BARRETT. I always thought so, too. But as I took it, in discussing lead time, Dr. Livingston said that the Russians were far superior to us in that respect even.

General IRVINE. That is a different problem. I would say this: You have to face up to the fact that if you have essentially a dictatorship, that your power to make a decision, right or wrong, is pretty fast. If you look at some of the decisions Hitler made in World War II, fortunately he made a couple of bad ones.

With a democracy, essentially a committee form of government, the decisions that are made are slower, but they are more often right, because this is not the opinion of any one man.

Certainly our method of making decisions can be speeded up by the very simple process of having less people in the decisionmaking process, and to try to make sure they are the best ones we have.

Senator BARRETT. I am quite certain you are correct about that, General Irvine.

Thank you very much, Mr. Chairman.

Senator STENNIS. Thank you, Senator Barrett.

Senator Carroll, do you have some questions here for General Irvine?

Senator CARROLL. Just one or two, General.

Did I understand that in 1953 you had developed a thrust, but you were waiting for the shape of the warhead?

General IRVINE. No. What we had done when looking at the early developments of the atomic bomb, was come to the conclusion with what we knew then of ballistic-type machines—with what we knew about guidance, that we were not ready to build essentially a ballistic machine and do an efficient job of knocking out targets considering the number of dollars or man-hours it would take per target. We went to the air breathing route, a pilotless airplane, a subsonic Snark or Navaho supersonic machine, which would in its time period carry

a big enough warhead and be more accurate. This appeared to be the best solution as we saw the state of the art at that time.

Looking back at it, maybe that was a bad decision. We could have developed a guidance for the ballistic missile while we were doing the other job. But our crystal ball just was not that bright.

Senator CARROLL. General, somewhere I read—as a matter of fact, there has been some testimony on it—that the Rand Corp. submitted a report to the Air Force in June of last year indicating that the Soviet Union would launch its sputnik on September 17. Was that information ever communicated to the other branches, the branches of the services, the Army and Navy?

General IRVINE. Normally we send copies of our Rand reports to other people including the Library of Congress, so this information was available to those who wanted to use it. Like any other set of logic, you could determine the validity of the assumptions and say it was wrong or right, I mean on whether you questioned the assumptions made. They turned out to be pretty good.

WORK GOING FORWARD ON RECONNAISSANCE SATELLITE

Senator CARROLL. Can you have under planning—you do not have to answer this if it is classified—did you, as sort of the production manager of the Air Force, did you have under consideration a sort of a reconnaissance satellite?

General IRVINE. We have been working toward that end in General Putt's department for a long time, and in this area we have been interested in that problem because we knew in the engine required for the ICBM we had the fundamental element required for the first step in the satellite.

Senator CARROLL. In other words, the ICBM engine——

General IRVINE. Yes, sir.

Senator CARROLL. Could be used to launch this reconnaissance satellite?

General IRVINE. Yes, sir.

Senator CARROLL. Mr. Chairman, I have had brought to my office a short time ago, a photograph, and this is certainly not classified, taken by the Boston University Physical Research Laboratory, which I understand is doing some research work for the Air Force, a picture of Denver, Colo., taken from Pike's Peak, 63 miles away, and taken evidently by a mirror camera, photographed with a red filter, and I am able to pick out with my eye, without the aid of a magnifying glass, the State Capitol, the Martin plant that is doing some military work, and many military installations.

The thought occurred to me whether or not, if you take a picture with a camera on a horizontal plane at 63 miles, if it is not classified, can you tell us how far you can photograph down?

General IRVINE. I think there again Mr. Horner can tell you more positively about this than I can, but we have cameras that will take pictures from a satellite in orbit.

Senator CARROLL. Pictures from a satellite in orbit?

General IRVINE. Yes, sir.

Senator CARROLL. Well, there has been some talk, as I remember, that——

General IRVINE. A lot of work on it.

Senator CARROLL. The Baruch plan talked about an inspection plan.

General IRVINE. Yes, sir.

Senator CARROLL. Years ago. The President of the United States spoke about an "open skies" program just in 1955, and here we are meeting in NATO today talking about a building up of our defense shield.

If we could launch such a satellite, reconnaissance satellite, I assume the Russians, being ahead of us, could launch one, too, and—

General IRVINE. Yes, sir.

Senator CARROLL. And by having such photographic cameras functioning, perhaps each of us would know what each other is doing; is that possible?

General IRVINE. I think this would be very healthy. This is the first step toward peace.

Senator CARROLL. Is that what you meant when you said, a little while ago, if we would use some of our money or devote our money to some of the research programs, is this one of the programs you have in mind?

General IRVINE. We have 3 Air Force programs with 3 different companies, 1 of which we have recommended for implementation.

Senator STENNIS. May the Chair interrupt to make this announcement:

The plans, the wishes of the chairman, and apparently it is the plans of the committee, is to try to finish tonight, and also try to finish without taking a recess.

We have two very important remaining witnesses here: Mr. Richard E. Horner, one of the Assistant Secretaries, and Major General Schriever. I am sure the testimony of both would be very helpful, and I know it is important.

So I hope the membership can remain.

Senator Carroll, do you have further questions?

Senator CARROLL. I think the General very much. I will talk to Mr. Horner, if I may, Mr. Chairman, Secretary Horner.

Senator STENNIS. Thank you very much, Senator Carroll.

General Irvine, let me just say this, and this is not any usual compliment, but I have been very much impressed with your testimony here. You certainly seem to me to bring a very practical, common-sense viewpoint, as well as what is bound to be a very skillful and scientific understanding, to this very complicated subject.

And sitting here listening to you, I just cannot see why we have to have so many of these highly expensive different missile programs or different types of missiles. And without any personal reference to you, it reinforces my general layman's view that this matter should be put in one centralized control, one authority or directorship or managership, someone to take a view of the whole problem and all the possibilities, and then make some decisions and have the authority and the wherewithal to carry them out.

I am very much impressed with your commonsense, as I say, I emphasize that, and down-to-earth discussion. You seem to know a great deal more than you have said, too, I will say that.

General IRVINE. I would like to make one more point, if I may.

Senator STENNIS. May I emphasize for the record one statement you made. In talking about being happy about having more money, I understood you to say that you would also be happier if you could better spend the money you did have.

General IRVINE. Yes, sir.

Senator STENNIS. That is a milestone for me in this kind of work, and I commend you highly for that statement. I think it came from your heart.

All right, did you have something further to say now?

General IRVINE. Yes, one simple thing.

Senator STENNIS. Yes.

General IRVINE. What we don't need down in Washington is more commissions, more czars, and more organizations. We have a President, a Congress, an administration, and a Secretary of Defense. I said, and I say again, we don't need any more czars or any more institutions.

We need decisions by the Secretary of Defense, and we need less people in the Office of the Secretary of Defense. We need the delegation to the three military departments of the jobs that belong to them, and somebody with guts enough to hit them over the head if they don't do it that way.

Senator STENNIS. Well, I would be satisfied with the Secretary of Defense if he, on this, if he did not have anything else to do, but I believe this thing has gotten too far, and that it is going to have to have a special setup.

All right, we thank you very much, very much.

Our next witness will be Mr. Richard E. Horner.

If Mr. Horner is here, if you will come forward, please.

Mr. Horner, you are Assistant Secretary of Air for Research and Development. I have a brief statement here that I will put in the record, with your permission, and you will now hold up your right hand.

Do you solemnly swear that your testimony before this committee will be truth, the whole truth and nothing but the truth, so help you God?

Mr. HORNER. I do.

(Mr. Horner's biographical statement follows:)

RICHARD E. HORNER

Mr. Horner is Assistant Secretary of the Air Force for Research and Development.

He was born on October 24, 1917, in Wrenshall, Minn. He received a bachelor of science degree in aeronautical engineering from the University of Minnesota in 1940 and a master of science from Princeton University in 1947.

He was commissioned a second lieutenant, Army Air Corps, in November 1940 after successfully completing pilot training in the Gulf Coast Training Command, San Antonio, Tex. His first assignments were as pilot with several tactical Air Force units, including an assignment as assistant group operations officer of the 47th Bomb Group. He later became the commanding officer of the 86th Bomber Squadron and operations officer of the 47th Bomb Group in north Africa. During his service there, Mr. Horner was awarded the Silver Star, the Air Medal with four clusters and the Presidential unit citation. He returned to the United States in August 1943 and was assigned as operations officer of the 46th Bomb Group. In January 1944 he was assigned to the Flight Test Section, Engineering Division, Air Materiel Command, where he held positions as Assistant Technical Executive and Chief, Test Engineering Subdivision.

In December 1949 Mr. Horner was released from active duty in the grade of colonel, USAF, and was employed in a civilian capacity as an aeronautical development engineer at the Air Force Flight Test Center, Edwards Air Force Base, Calif. He later became technical director of the test center in January 1952, holding that position until his assignment as Deputy for Requirements to the Assistant Secretary of the Air Force for Research and Development on May 9, 1955.

Mr. Horner was appointed Acting Assistant Secretary for Research and Development on February 28, 1956, becoming Assistant Secretary on July 8, 1957.

Senator STENNIS. Have a seat.

Let us have order, please. Those who have to retire, please do so now.

**TESTIMONY OF HON. RICHARD E. HORNER, ASSISTANT SECRETARY
(RESEARCH AND DEVELOPMENT), UNITED STATES AIR FORCE**

Senator STENNIS. Mr. Secretary, I am going to ask committee counsel to proceed with his examination.

Mr. WEISL. Mr. Horner, what position do you occupy in the Air Force?

Mr. HORNER. Assistant Secretary of the Air Force for Research and Development.

Mr. WEISL. What are your duties, briefly?

Mr. HORNER. The supervising and directing of the overall policy-making and programing of the research and development effort of the Air Force and to serve as a technical adviser to the Secretary of the Air Force.

Mr. WEISL. What background of experience and education have you had?

Mr. HORNER. I have a bachelor's degree in aeronautical engineering and a masters degree in aerodynamics.

Mr. WEISL. How long have you been with the Air Force?

Mr. HORNER. Since 1940, sir.

Mr. WEISL. You work closely with General Putt; do you not, Mr. Secretary?

Mr. HORNER. I do, indeed.

Mr. WEISL. You heard his testimony?

Mr. HORNER. I did.

Mr. WEISL. There were some questions that I wanted to ask both of you that I failed to ask, and I wonder if you could supplement General Putt's testimony in order to save time?

Mr. HORNER. I would like to try.

Mr. WEISL. Please do.

Mr. HORNER. Did counsel want to put the individual questions?

Mr. WEISL. Either way, you can supplement it in your own words, and that perhaps might be better for you and easier, or would you prefer that I asked the questions?

Mr. HORNER. I would prefer if counsel had any individual points that he would—

Mr. WEISL. In connection with working on satellites and ballistic missiles at the same time, do you think that that would take any effort away or any development away from either program?

Mr. HORNER. I think it would be utter folly to reduce the sense of urgency on the ballistic-missile program at this time.

I think the Secretary of the Air Force stated it very well this morning in that he would give both equal top priority with the reservation that if there should be a conflict, the question would be resolved in favor of the ballistic-missile program.

I do not see any need for such conflict.

Mr. WEISL. Do you believe that the satellite program and the ballistic missile program are interrelated?

Mr. HORNER. Yes, they are. They are indeed. They are from a technical point of view. They use the same techniques, the same developments, and to a degree they are interrelated operationally.

Mr. WEISL. Has the Air Force done considerable work in research and development on satellites?

Mr. HORNER. We have had a program in what we call astronautics, for a considerable period of time, since the close of World War II. We have done a great deal of fundamental work in component development, the development of technical aspects of travel in outer space; work on such things as propulsion systems, guidance systems, as well as work on the physiological problems of man near the top of the atmosphere and in outer space.

HAVE WORKED ON MILITARY SPACE VEHICLES

Mr. WEISL. Could you tell us what—if you worked on space vehicles to be used by the Air Force for military purposes?

Mr. HORNER. We have.

Mr. WEISL. Can you tell the committee something about that?

Mr. HORNER. We have had a very comprehensive program in this area, as I said. We have been making very real progress. As to the exact status of this program at this time, and just how far we have gone, I would ask counsel's permission to supply this for the record or give it in executive session.

(An Air Force memorandum titled "USAF Astronautics Program" is included in the classified records of the subcommittee.)

Mr. WEISL. Thank you, sir.

Did the Air Force submit a satellite proposal for the International Geophysical Year?

Mr. HORNER. Yes, sir, it did.

Mr. WEISL. Who did you submit it to?

Mr. HORNER. The Office of the Secretary of Defense.

Mr. WEISL. Was it turned down?

Mr. HORNER. Yes, sir; it was.

Mr. WEISL. Do you believe that the Air Force could have projected a satellite in orbit before the Russians?

Mr. HORNER. That is a very complex question, Mr. Counsel. I believe that it could, if it had set off with that objective in mind.

I should add that the proposal that the Air Force made to the Office of the Secretary of Defense for a satellite during the IGY did not have that as an objective. And I should also add that it was a proposal which included the use of military hardware, that is, hardware from the military missile program. And when the decision was made to completely separate the IGY satellite program from the military hardware, well, that ruled out the Air Force proposal in this area.

Mr. WEISL. Have you been doing research work on an alert system to alert SAC or any other defense that we have for retaliation in the event of an attack?

Mr. HORNER. We have an operational capability, of course, in the DEW line and the mid-Canada line for alert against manned aircraft or other aerodynamic vehicle attack.

We have been doing a great deal of work in research and experimental development work on the hardware necessary to provide an alert capability against an attack by ballistic missiles.

Mr. WEISL. Do we have any alert system that would alert SAC in the event of a ballistic-missile attack?

Mr. HORNER. We do not have such a system operational.

Mr. WEISL. Is there a sense of urgency about putting such a system in operation?

Mr. HORNER. There certainly is in the Air Force at this time.

Mr. WEISL. Have you sufficient funds to put such a system in operation?

Mr. HORNER. We will bring to the Congress very shortly after the beginning of this next session a proposal for supplemental funds in fiscal year 1958 program. Without these funds, we do not have sufficient resources.

Mr. WEISL. So, at the present time, you do not have sufficient funds to start an alert system in operation?

Mr. HORNER. We have sufficient funds to start. We are taking somewhat of a risk in that if the Congress should not see fit to approve our request for a supplemental appropriation it would badly dislocate the program inasmuch as we are using faster the funds that we do have on the assumption or on the hope that we will have such an approval.

Mr. WEISL. Would you say that the DEW line today is obsolete?

Mr. HORNER. No, sir.

Mr. WEISL. Would you say that the SAGE system is obsolete?

Mr. HORNER. No, sir.

Mr. WEISL. Do you believe that it can stand improvement?

Mr. HORNER. Yes, indeed.

Mr. WEISL. Are you working on those improvements?

Mr. HORNER. We are.

Mr. WEISL. Is it not a fact that both the SAGE system and the DEW line can easily be jammed by decoys?

Mr. HORNER. Almost any electronics system can be jammed, if enough effort is spent in so doing. As to whether they can be easily jammed is a matter of degree and to what extent they are jammed. It is, certainly, relatively easy to apply limited jamming. There are also countermeasures that we can apply to counter such jamming.

Mr. WEISL. Yes, and you are working in research and development to improve the systems constantly, are you not?

Mr. HORNER. We are.

Mr. WEISL. Is research underway, Mr. Horner, looking toward a more advanced ICBM than either the Titan or the Atlas?

Mr. HORNER. It is.

Mr. WEISL. And are you making progress in that direction?

Mr. HORNER. Yes, sir.

Mr. WEISL. Have you sufficient funds and sufficient manpower to continue that research?

Mr. HORNER. We do, at the moment. It is very likely that we will need more funds than we have in our current resources in this particular area.

Mr. WEISL. Why was the decision made to develop a Titan, when you were already so far advanced on the Atlas?

Mr. HORNER. We recognized at the beginning of the acceleration of the ballistic-missile program, that there were several very difficult technical problems to be solved. We ascribed a great deal of urgency to obtaining an operational ballistic missile.

In view of these two facts, we felt that we very badly needed technical backup. One of the very serious problems that we recognized was getting an airframe, for example, with the proper structural capabilities to withstand the high-thrust loads, the high atmospheric loads as it left the atmosphere in order to do its mission.

The Atlas missile was one approach to this problem. Its air frame was considered, at the time of the beginning of the development, to be one of the more risky elements of the program.

The Titan is another approach to the problem and, also, was engineered to give a bigger payoff, a bigger operational capability should we not have to use it for a backup for Atlas.

Mr. WEISL. Do both the weapons systems have the same range, approximately?

Mr. HORNER. In their current configurations, they do. I intended to infer before, and I will repeat, that the Titan appears to have a greater growth capability, because of its configuration, as far as range is concerned.

Mr. WEISL. Are the parts of the Titan and the Atlas interchangeable?

Mr. HORNER. They are interchangeable, with some engineering modification. We did not want to compromise the value of getting insurance from different technical approaches by making them exactly the same. Where we could use components on an interchangeable basis, to provide backup should one component in the Atlas fail, we did that.

Mr. WEISL. Will concentrating on both the Titan and the Atlas slow up either program?

Mr. HORNER. No, sir; it will not. It will not, providing, of course, adequate resources are made available. If we took current resources and divided them up equally, put them half on each program, it would slow up both.

Mr. WEISL. But your plan is not—

Mr. HORNER. May I correct that, please?

Mr. WEISL. Yes, sir.

Mr. HORNER. It would speed up the Titan in its current status, but it would tend to slow down the Atlas.

Mr. WEISL. When you make a test of either—when you make a test of the Atlas, you only test the propulsion, isn't that right, and an autopilot—what I am trying to get at, or would you rather not discuss that?

Mr. HORNER. No, sir. I am just—I would like to define the question perhaps a little better. I believe counsel is referring to flight tests.

Mr. WEISL. Yes, sir.

Mr. HORNER. Current flight tests of the Atlas program are primarily for the purpose of testing the propulsion system, its functional reliability, the airframe, its capability to withstand the loads of the propulsion and the aerodynamic loads, as it passes through the atmosphere, as well as the autopilot control system which controls the missile on course.

Mr. WEISL. But the test does not test the guidance system or the nose cone?

Mr. HORNER. We have adopted a policy of testing the ballistic missiles on the basis that we make each test progressively more difficult. As we prove out one set of gear, we add additional components for the next set of tests.

Mr. WEISL. But you wouldn't have a complete test until you test the engine, the propulsion, the guidance, and the reentry of the nose cone; is that not a fact?

Mr. HORNER. That is correct, sir.

Mr. WEISL. And that has, as yet, not been done?

Mr. HORNER. That is correct, sir.

Mr. WEISL. Is the Air Force planning to utilize the Navy Polaris for land-based purposes?

Mr. HORNER. The Air Force is working with the Navy on possible development of such a system.

Mr. WEISL. Is the Polaris suitable for land-based operation? I mean you don't know that definitely, of course, now, because none has been produced yet, but could it be suitable, if it is produced?

Mr. HORNER. It could be; yes, sir, as a land-based system. Of course, this requires some modification of the system as currently planned.

Mr. WEISL. Are you doing any work in that connection, looking toward the use of the Polaris as a land-based version of an IRBM?

Mr. HORNER. Mr. Counsel, we have been doing work in this area for several years.

Mr. WEISL. In the solid-propellant area?

Mr. HORNER. Yes, sir.

Mr. WEISL. So that, when solid propellants become usable, the Air Force will be ready with its research and development so as to use that propellant as quickly as any other branch of the military service?

Mr. HORNER. Yes, sir. We are already using them on some weapons.

Mr. WEISL. What is the advantage of a solid propellant over a liquid propellant?

Mr. HORNER. Solid propellants—

Mr. WEISL. Whatever questions I ask, Mr. Horner, that you feel should not be discussed in public, please don't discuss them.

SOLID PROPELLANTS THE MORE RELIABLE

Mr. HORNER. I am very mindful of security.

Solid propellants in our past experience tend to be more reliable. They have very few, if any, moving parts, very few things that can

malfunction. The chemistry of combustion is fairly regular and repeatable.

For this reason, this is a very attractive characteristic for military application, because when you plan to use a weapon, you would like to have it go according to plan. This, I would say, is one of the major advantages of solid propellants.

Mr. WEISL. Senator Barrett, in examining General Putt, spoke about the possibility of using one base for intercontinental ballistic missiles. Do you consider that a practical thing?

Mr. HORNER. I think there was some question of exactly what is one base. General Irvine stated that his concept of a base was a central location for logistics support maintenance, with operational sites dispersed about that base.

Now, we feel one of the methods of protecting against counterattack is dispersal. There, of course, is a limit as to how many miles you can disperse from a central base and still have utility, real utility and economic utility of that central base.

Mr. WEISL. How long does it take to fire 1 missile, 1 intercontinental ballistic missile?

Mr. HORNER. I would prefer to provide that information to counsel. (Subsequently the requested information was provided and is included in the classified records of the subcommittee.)

Mr. WEISL. Could you fire a large amount of them at one time from one place?

Mr. HORNER. If you provided enough equipment so that each unit worked essentially as a unit and independent of the other.

Mr. WEISL. Could you practically provide enough equipment on one base for that purpose?

Mr. HORNER. Well, there certainly is a limit to the practicability as I mentioned of how much equipment you put on one base.

Mr. WEISL. From my interviews with the Air Force, they are planning several bases, are they not?

Mr. HORNER. That is true.

Mr. WEISL. For several reasons. One, that if one base is knocked out, they would not be left without a base. And secondly, because I am told it would not be practical nor would it secure the Nation to limit the disposition of intercontinental ballistic missiles to any one base.

Mr. HORNER. One of the very important characteristics effecting the deterrence of a military machine is the number of aiming points that are provided for the opposition. Of course, it is desirable to maximize this number and this is not accomplished by concentrating all of your strength at one place.

RELIANCE FOR PRODUCTION ALMOST TOTALLY ON INDUSTRY

Mr. WEISL. I understand that the services have different methods of developing weapons. What is the method that the Air Force uses to develop weapons that it uses?

Mr. HORNER. The Air Force is a relatively young organization, as you know, and it has been more or less brought up on technology and the industrial capacity of our country. From the very beginning we have relied almost totally on the American industry to pro-

duce—to develop and produce our material. We retain within the Air Force as what we call an inhouse capability, only that amount of capability necessary to evaluate the proposals of industry, to select a proper source for development, and then evaluate the completed hardware of industry to be sure that they have indeed met our stated requirements for which we paid them in the development.

Summing that up very briefly, we rely almost entirely on the American industry to do our development problems.

Mr. WEISL. And you have had satisfactory results by relying on American industry, have you not?

Mr. HORNER. We do not really see any other way to do it.

Mr. WEISL. Have I failed to ask questions the answers to which ought to be given?

That is a rather clumsy way of putting it, I realize. But are there some things that you think the committee ought to know that I have not asked you about?

Mr. HORNER. I might enlarge for just a minute. I made a few notes while General Putt was talking. In response to your question of what were some things, some very important things that needed to be done and what could we do to improve the research and development program, I think the one thing that he mentioned first, and is probably of most importance, and General Irvine also mentioned it, is the question of educating America in the needs for military research and development.

Unfortunately, the best source for such information seems to be the military because they have the most intimate knowledge of what is needed, what the requirements are, what the technology affords. The military on the other hand is in a very poor position to do this educating. In fact, it is almost impossible to do a very consistent program of such educating without appearing somewhat self-serving.

I think in that respect the work of this committee and the facts that have been brought out in these public hearings has been invaluable. Our history of the past 10 years I think illustrates my point very well. We finished World War II and our first effort was to demobilize. We very shortly thereafter became somewhat disenchanted with the U. S. S. R. and started to build up, to find late in the 1940's that we were not really convinced that we needed a military machine, and started to decrease emphasis again.

The Korean incident came along and our military activities in research and development soared. In the past few years, the support of military research and development has again been tapering off in comparison with the need. It is extremely harmful and extremely expensive in total overall scientific effort of the United States to have these oscillations in support.

Likewise it is very important that everybody understand some of the fundamental facts of research and development. We cannot always expect to be successful. If we have a research and development program that breeds only successes, it can mean only one thing and that is that we are entirely too conservative in selecting our research and development goals.

We must be willing to accept failure, but we have not been willing to accept failure, and it is because we have not been willing to accept

failure to a large degree that we have the organizational problem that you have heard criticized by so many witnesses here. It is a matter of fireproofing against risk, to have repeated reviews of research and development projects, have repeated committee actions on research and development projects. We must be willing to accept an occasional failure, willing to accept the fact that it is worthwhile tackling a job that may not be completely successful. Let me cite an example; the recent cancellation of the Navaho program has been widely criticized. The Navaho program was anything but a total failure. We have had tremendous research advantages out of the expenditures in that program.

True it was not successful in producing the final operational weapon that was originally intended, but there was a great deal of work accomplished in materials, in propulsion, in solid-state physics, in aerodynamics that has been useful to us and will be used in the future.

I think this is the most important thing that we need to accomplish in the United States.

One other thing that comes a little closer to Government operation. We will be, as I mentioned previously, coming to Congress very shortly for additional appropriation requests for this fiscal year. Almost immediately thereafter, we will be coming to Congress for appropriation requests for the next fiscal year. We would hope that the Senate will give us the same fine support in these requests that they have in past years.

There are numerous smaller items, but in some respects equally important matters, that we are looking at now as possible areas for new legislation.

We have, for example, in the research and development program, the problem of never being able to anticipate exactly what we are buying. This is a very difficult procurement problem. Our method of solution in the past has been to negotiate with our suppliers what we call cost-plus-fixed-fee contracts. A large part of our development program is purchased on that basis. These contracts have been criticized and, to a degree, rightly so, in that they do not offer proper incentives for efficiency.

I believe you, Mr. Counsel, asked the question earlier whether we should go more to performance-type specifications and give industry more freedom in the technical solutions. This, certainly, is an objective. There are some reservations, however, that must be recognized. We, as I mentioned, must retain the capability of introducing military factors into these technical solutions. We must retain the capability of evaluating the final product. But we do need a better method of contracting, in my opinion, to provide the necessary incentives to our industry, and incidentally, the necessary penalties to our industry if they do not perform. One goes with the other. I do not think we can have one without the other.

One of our difficult problems in research and development is retaining a proper balance between the various elements of the program. By this I mean the elements of the program such as buying current hardware that has been fully or almost fully developed, paying for technical developments to be applied in the near future, buying developments that are further off, perhaps 3 to 5 years, and paying

for the research program that will not produce new weapons until many years in the future.

As you know, and as has been indicated previously, we pay for our research and development program with many different types of moneys. We need additional program flexibility in order to properly support these different areas of our research and development program. Right now we are supporting our research and development program with research and development appropriations, appropriations for the procurement of aircraft and missiles, appropriations for the procurement of other than aircraft and missiles. We even get support from maintenance and operations funds, and, of course, we are supported by funds that go to pay for military personnel. So, the research and development program is supported by all of the different appropriations, and it is not enough to provide just the research and development appropriation to have a successful research and development program.

We in research and development have just as big a problem as the rest of the Air Force, as discussed by General White and General LeMay, in the retention of skilled personnel. I think I need say no more about that.

It has been recognized in Congress, in the past year or two especially, that the provisioning of research and development facilities under the present law was not always satisfactory. I say it has been recognized in Congress because in specific instances there have been bulk authorizations and bulk allotments of moneys, whereas in most cases we must get a line-item authorization and a line-item appropriation for a facility, for a research or a development project in a time period when we cannot truly identify exactly what this facility might look like. It is difficult for us, in many cases, to use the same authorization and appropriation methods in providing research and development facilities that are used for providing post offices, just for example.

I would like to emphasize one remark that was made in this morning's session, and that is the matter of international cooperation in research and development. We have recognized, since the end of World War II, that there was a great deal of scientific talent, especially in Europe, that was unemployed. We have cooperated as much as we could under the law and with the resources that were available. We have tried to get the best possible joint program with the scientific talent that was available.

We have done very well. We can do better. We have some statutory limitations, as you know.

I have just one other point that I might mention.

I noticed throughout all of the testimony a thread which seems to indicate to me the general opinion that what we have called our astronautics program, what might be called space exploration, is something that is really quite expensive.

Relative to the efforts we now have in other fields, and specifically in the ballistic-missile fields, it can be really quite cheap—quite reasonable indeed.

This is true because we have a large part of the industrial plant that is needed. We have a large part of the test facilities that are needed and we have a lot of the techniques fairly well in hand.

What is left to do now is to put these things together, and there is a great number of different things that can be accomplished—a list that would be truly challenging—for a relatively small investment over the next few years.

I don't believe I have any further point, Mr. Counsel.

Mr. WEISL. Mr. Horner, I congratulate you on the statement that you have just made. It was a thorough, challenging, factual, and very helpful statement.

My time is up, Mr. Chairman, for questioning Mr. Horner.

Senator JOHNSON. Thank you very much, Mr. Horner.

Any questions, Senator Bridges?

Senator BRIDGES. No questions.

Senator JOHNSON. Senator Kefauver, have you any?

Senator KEFAUVER. I don't believe so.

Senator JOHNSON. Senator Bush?

Senator BUSH. No; I would just like to endorse what counsel has said in a complimentary vein. I think, at the end of a long day, and the Secretary has been sitting here all day, that was a very fine presentation of his views and very helpful. It will make a splendid record for us.

Senator JOHNSON. Senator Barrett?

Senator BARRETT. Mr. Chairman, I just wanted to ask Secretary Horner about the matter of the facilities base.

Assuming that on 1 base there were 5 complexes surrounding it, could not there be another 5 several miles out from those 5?

Mr. HORNER. Senator Barrett, may I speak in generalities?

Senator BARRETT. Yes; that is what I want.

Mr. HORNER. We have considerable data by which we establish lethal radii, radii of damage for nuclear explosions.

Now, of course, one must make assumptions as to what nuclear explosions might be posed against us.

We have to be somewhat conservative in this matter because we, very likely, won't be given a second chance if we are mistaken.

STUDIES SHOW NEED FOR DISPERSAL

All of our studies indicate to us that we want, really, quite considerable distances between launch facilities for our ballistic missiles.

Now, to the limit of practicality, practicality of how large a complex you support from 1 central base, how much equipment you provide at 1 central base, it is, of course, most economical to deploy weapons as centrally as you can without accepting too large a risk from counteraction.

I would be happy to provide greater detail in executive session, or General Schriever would.

Senator BARRETT. Thank you very much.

Senator JOHNSON. Senator Carroll has a couple of questions.

Senator JOHNSON. I would like to announce before Senator Carroll put his questions the next witness will be Major General Schriever. I want to notify the General that we do expect to conclude with his testimony this evening and we expect him to stand by.

Senator Carroll?

Senator CARROLL. Mr. Secretary, the questions I put to General Irvine about the photography, did you hear those?

Mr. HORNER. I did, sir.

I would appreciate it if my memory might be refreshed at least in the order in which they were put.

Senator CARROLL. I think I might state to the chairman, too, and Senator Bridges that I have in my hand received about an hour and a half ago a photograph from Pike's Peak taking a photograph of Denver, which is 63 miles away.

It is a very clear photograph taken by the Boston University physical research laboratory, and I put the question of whether or not such a program is underway, I call it a reconnaissance satellite program, being considered by the Air Force.

Is there such a program underway, under consideration?

Mr. HORNER. I believe General Irvine indicated that there was, and I have no reason to disagree with him.

As I mentioned previously, I could prefer not to, in open session, state exactly where we are on such a program.

As the Senator probably knows, the Boston University work from which these pictures resulted is Air Force supported and supported for this purpose.

Senator CARROLL. I think that was brought out in testimony. My purpose in bringing it out was to find out whether or not, and I think it has been answered, Mr. Chairman, whether or not such a photograph could be taken of a satellite in orbit.

Is that classified information?

Mr. HORNER. It is not classified information.

In general terms it is possible.

Senator CARROLL. General Irvine said that it could be done.

Mr. HORNER. Yes, sir.

Senator CARROLL. Do we have such photographic equipment?

Mr. HORNER. We have tested it.

Senator CARROLL. If it is classified don't answer it.

Mr. HORNER. We have test equipment, sir. I would be very happy to provide you with greater detail, either to you personally or to the committee in executive session.

Senator CARROLL. Do you agree with the general that if we could have such a satellite circling the earth, that could take photographs, undoubtedly the Soviet Union must have a satellite, from what we have observed.

Would that be a great contribution toward peace, the so-called inspection and open sky program?

Do you agree with that?

Mr. HORNER. My personal opinion is that it would; yes, sir. I might add that there are some obvious differences in motivation as to accomplishing this.

Senator CARROLL. How far in the future is such a program?

Mr. HORNER. That I would prefer to answer in executive session, sir.

Senator CARROLL. That is all, Mr. Chairman.

Senator JOHNSON. Thank you, Senator Carroll.

Thank you, Mr. Secretary.

The function of this committee is to find the facts. We appreciate your cooperation in helping us in our search for the facts. Your testimony has been helpful and we commend you for the statement you have made.

Thank you very much.

The next witness is Maj. Gen. Bernard A. Schriever.

General Schriever is the commander of the Air Force Ballistic Missile Division under the Air Research and Development Command.

The chairman notes with interest that General Schriever is a graduate of Texas A. and M. College.

General Schriever flew 63 combat missions with the 19th Bombing Group in the southwest Pacific. He later assumed command of the Advanced Headquarters Far East Air Service Command.

After the war his assignments were in the field of research and development.

In his present position General Schriever has immediate control and supervision over all aspects of the Air Force Ballistic missile program.

General Schriever, do you solemnly swear that the testimony you give this committee will be the truth, and the whole truth?

General SCHRIEVER. I do.

Senator JOHNSON. General Schriever, the committee welcomes you. We are delighted you are here. We are sorry we are reaching you so late. It has been a long schedule and we have tried to permit every Senator and every witness to say his piece.

The associate counsel is prepared to examine you.

I trust he will do it thoroughly and as briefly as possible.

(The biographical sketch of General Schriever is as follows:)

General Schriever is commander of the Air Force Ballistic Missile Division under the Air Research and Development Command.

He was born in Bremen, Germany, on September 14, 1910, came to the United States in 1917, and was naturalized a United States citizen in 1923. He graduated from Texas A. & M. in 1931 with a bachelor of science degree. He received his master of science degree in 1942 from Stanford University.

General Schriever began his military career in 1931 and received his wings and commission as a second lieutenant in the Air Corps Reserve in June 1933. He then performed flying duties at March and Hamilton Fields in California and Albrook Field, Panama Canal Zone. In September 1937 he accepted a position as a pilot with the Northwest Airlines.

Reentering the service in October 1938, General Schriever was assigned to the 7th Bomb Group at Hamilton Field, Calif. In October 1939 he was assigned to test-pilot duties at Wright Field, Ohio. He graduated from the Air Corps Engineering School in July 1941.

In July 1942 General Schriever joined the 19th Bomb Group in the southwest Pacific. While in that theater he flew 63 combat missions. In December 1942 he became chief of the Maintenance and Engineering Division, 5th Air Force Service Command.

He held this position until August 1943, when he was appointed chief of staff, 5th Air Force Service Command, Japan. In September 1944 he assumed command of the Advanced Headquarters, Far East Air Service Command.

General Schriever was assigned to Army Air Force Headquarters in January 1946. In June 1950 he graduated from the National War College; then he became assistant for evaluation, Office of the Deputy Chief of Staff, Development. Assistant for development planning was his next assignment in January 1951.

In May 1954 he became assistant to the commander, Air Research and Development Command, Baltimore, Md. That August General Schriever assumed command of the Western Development Division located in Inglewood, Calif.

On June 1, 1957, it was redesignated the Air Force Ballistic Missile Division, Headquarters, Air Research and Development Command, with no changes in mission or organization.

As such, General Schriever has immediate control and supervision over all aspects of the Air Force ballistic missile program.

His decorations include the Distinguished Service Medal, Legion of Merit, Air Medal, and the Purple Heart.

TESTIMONY OF MAJ. GEN. BERNARD A. SCHRIEVER, COMMANDER OF THE AIR FORCE BALLISTIC MISSILE DIVISION

Mr. VANCE. General Schriever, you have a unique organization and I would like to briefly explore how it is set up.

Would you first tell us what are your duties and responsibilities as commander of the Ballistic Missile Division?

General SCHRIEVER. I have the overall supervisory responsibility for the Air Force ballistic missile program, and my directive gives me control and authority over all aspects of the Air Force ballistic missile program.

Mr. VANCE. That would include research, development, and the production of ballistic missiles?

General SCHRIEVER. Yes, it does. However, we have other elements of the Air Force located right there over whom I exercise management control.

Mr. VANCE. Who are they, General?

General SCHRIEVER. Well, there is the Ballistic Missile Office, which is part of the Air Materiel Command. This is headed by General Funk, and that organization does all of the contracting procurement work for us, and also the logistics activity for the Air Materiel Command, but we operate together as a single management entity.

FIRST MISSILE DIVISION ASSIGNED TO HIS COMMAND

Now, the recent decision assigning the initial operational capability to the Strategic Air Command, which had been planned all along, means that part of my headquarters is being assigned, that is, the plans and operations portion, and the first ballistic missile division or the first missile division is being assigned to the Strategic Air Command for operational control.

But again, the total planning, programing, and budgeting for the entire program and the overall supervision will be exercised from that central location in Los Angeles.

Mr. VANCE. General, why was the ballistic missile division established?

General SCHRIEVER. Why was the ballistic missile—

Mr. VANCE. Why was it established? This was a different and unique sort of step.

General SCHRIEVER. It was established, it stemmed from the recommendations made by the Von Neumann Committee, which was set up under Trevor Gardner in 1953 to evaluate the Air Force strategic missile program.

Among their recommendations in accelerating and expediting the ballistic-missile program, he recommended that a unique management organization be established to carry out the program, and it stemmed from that recommendation.

It was called the Western Development Division at that time.

Mr. VANCE. Could you tell us the interrelationship of your organi-

zation with industry? I believe the Ramo-Wooldridge Corp. is connected with your operation, is it not?

General SCHRIEVER. That is correct.

Mr. VANCE. Could you explain that relationship, please?

General SCHRIEVER. The guided missiles research division of the Ramo-Wooldridge Corp., which recently changed its name to Space Technology Laboratories, which is a separate division of the Ramo-Wooldridge Corp., has the systems engineering responsibility, technical direction, for the program; and as such is in a line position with regard to the program.

Mr. VANCE. Pardon me; what do you mean by a "line position"?

General SCHRIEVER. Well, they are not just my staff. They are a contractor to the Air Force which has a specific responsibility for systems engineering and technical direction of the program.

Mr. VANCE. But you are in overall charge of the program, and they make recommendations to you, and you are the one who makes the decisions; is that correct?

General SCHRIEVER. No; not any more so than I would go into some other company like North American and make all of their decisions in the development of the rocket engine, for example.

Now, I do have the authority to make decisions, any decisions with respect to the program, but I would certainly be hard pressed if I made every technical decision and approved every technical decision that was made in a program of a billion dollar a year magnitude.

Mr. VANCE. Is there anything else that you feel we should know with respect to the organization which you have?

General SCHRIEVER. Yes. I would like to stress a point that General Irvine made in his testimony about the importance of carrying on a program where you start with the development responsibility and think all the way through to establishing an operational capability, and do a total planning, a total programming, a total budgeting, and a total implementing job in all of these areas, because many of them, many actions have to be taken concurrently.

I think this management organization of ours is somewhat unique in this regard, and it points up the importance of thinking about all of these elements, and I think this is one of the reasons why we have been confident that we have compressed time to this point in the program that we have had under way now since 1954.

HAS SUFFICIENT AUTHORITY

Mr. VANCE. General, in your view, do you have sufficient authority in your position to carry out the job you have been assigned?

General SCHRIEVER. Yes; I do.

Mr. VANCE. And you don't feel that it is necessary to give you any further authority?

General SCHRIEVER. Not from the standpoint of implementing the program once it is approved.

Mr. VANCE. I gather from that that there may be some delays in getting the program approved at the outset, however.

General SCHRIEVER. Well, I think you can—there are delays in getting program approvals. However, any time that you are involved in a program of the magnitude of this one, I think you must expect

some review by higher authority and it is natural to expect some delay in program approval.

Mr. VANCE. I would like to try to touch on that in a moment.

Admiral Raborn testified that he, in effect, had a blank check from the moment the Polaris program was started, and that he didn't have to worry about funds. Has that been true in your case?

General SCHRIEVER. I have never had a blank check.

Mr. VANCE. Have you been hampered by lack of funds?

General SCHRIEVER. I have not been hampered by lack of funds. I could use more. I could have used a little more this last fiscal year. But I can truthfully say that as far as the research and development effort is concerned, I have not been hampered by the lack of funds.

Mr. VANCE. Do you have sufficient funds at this time to proceed with the program as fast as you feel it should go?

General SCHRIEVER. I do as far as the research and development portion of the program is concerned. There might be, or I would say that we could probably use a little more in support of the Titan program for the addition of certain test vehicles which we eliminated from the program during the past year, but based on our own judgment that we were willing to take the little additional risk.

As far as the—

Mr. VANCE. Could I interrupt there just a minute?

Have you made such recommendations for additional funds in order to carry out what you feel should be done with respect to the Titan program?

General SCHRIEVER. We have submitted new Titan programs to the Pentagon, as General White pointed out, and there have been recommendations made by the Air Staff and the Secretary to the Department of Defense for an increase in the Titan program.

Mr. VANCE. Were those recommendations as extensive as you thought they should be?

General SCHRIEVER. Well, let me say this: They were as extensive as I thought they should be in terms of the research and development program. It is not up to me to say exactly what the size of the operational force should be or how fast it should be built up.

This is a decision that has to be made in conjunction with a lot of other factors, and I can say that we could build up faster than the present programs that have been approved.

Mr. VANCE. And you so recommended?

General SCHRIEVER. I did not recommend. I simply indicated what our capability was.

Mr. VANCE. Now, with respect to the Atlas program, first of all, General, as the one which is in charge of the Atlas program, can you tell us anything further than was announced in the press release? If it would involve any classified material, please don't do it, but it would be helpful.

General SCHRIEVER. The press release, and I have seen the press release, I think it is quite complete, and I would rather not say anything more about it. The flight, from our point of view, completely fulfilled the objectives for it.

Mr. VANCE. Now, with respect to the Atlas program, have the

component problems of nose cone, guidance, and propulsion been solved?

General SCHRIEVER. Yes, I think they have. We—the propulsion program has been very vigorously pushed, and we feel that the propulsion units themselves are definitely past the initial development phase.

From the nose-cone standpoint, we have had very large numbers of tests on the ground, in shock tubes, wind tunnels. We have had a complete flight test program with the Lockheed RTV, called the X-17. Except for a full-scale, all-the-way test, which of course is the proof of the pudding, we are completely confident that we have the nose-cone problem in hand.

Mr. VANCE. Well, we will defer any further discussion of that until we get into executive session.

General SCHRIEVER. Yes, I would rather defer any further discussion on that.

Mr. VANCE. Now, with respect to the Atlas program, it was testified today, and I believe at the session at which Mr. Holaday testified, that the program had been accelerated or at least an order had gone out to accelerate the program.

Can you tell us anything about that?

General SCHRIEVER. We received an order on the 14th, I think it was wired down on the 13th of December, which increased the size of the operational force for Atlas missiles.

I think that is all I can say in open session.

Mr. VANCE. All right, General.

In your view, can the program be further accelerated?

General SCHRIEVER. From the standpoint of capability, it could be, yes.

Mr. VANCE. And have you so recommended?

General SCHRIEVER. I have not recommended, again for the same reasons I gave you a moment ago. This is a matter that I really don't have the responsibility for. I can certainly indicate to the Air Staff, and the Secretary what our capabilities are in terms of production, in terms of what we can train, personnel we can train, what we can do in terms of building bases and so forth, but I can't make the decision on what the operational buildup should be.

Mr. VANCE. But you have indicated that you think the program can be further accelerated?

General SCHRIEVER. I have indicated that we had a greater capability than had been approved, yes, sir.

Mr. VANCE. What will it take to do that, more funds?

General SCHRIEVER. It would take more funds.

Mr. VANCE. Now, with respect to the Thor missile. In Mr. Weisl's examination of General Irvine, reference was made to an August 1957 cutback, and General Irvine was asked whether or not the cutback delayed the Thor production.

As I understand it, that was a cutback both in missiles and in ground-support equipment.

General Irvine said that he was unable to answer, or that you could answer better whether or not that order did delay the Thor program.

General SCHRIEVER. Well, I don't think there can be any question but that it delayed the Thor program. We were cut back to a rate of two per month, and instructed not to proceed with ground-support equipment beyond the prototype sets that were mentioned by General Irvine.

It would be difficult for me to say exactly how much it delayed the program because we are doing everything we possibly can to catch up this time.

As a matter of fact, we are giving the same schedules now that we gave before. But without it, without having had that delay, I think we could have done even better.

Mr. VANCE. How long was that cutback in effect, General?

General SCHRIEVER. From August until December.

Mr. VANCE. August of 1957?

General SCHRIEVER. This year.

Mr. VANCE. Until December. When in December was it lifted?

General SCHRIEVER. I have forgotten the exact date. It was early this month.

Mr. VANCE. Early this month?

General SCHRIEVER. Yes, sir.

Mr. VANCE. Did you recommend against this cutback, General?

General SCHRIEVER. I would never go along willingly with a cutback.

THOR AHEAD IN TOOLING

Mr. VANCE. Now, with respect to the Thor, I believe that General Irvine testified that the Thor was 9 months ahead of the Jupiter in tooling. Does that also mean that it is ahead of the Jupiter in the capacity to us the missile?

General SCHRIEVER. Well, I listened very carefully to what General Irvine said, and I agree with everything he said. We did undertake our program, as I pointed out previously, on a total weapon system to operational use plan and programming and budgeting manner, and we did go to industry and we have built our development models on hard tooling.

I feel that from a production standpoint there is no question but that we are in order of 9 or 10 months ahead or 9 to 12 months ahead of Jupiter.

Mr. VANCE. Now, with respect to the Thor program, do you feel it can be further accelerated, or is it going at maximum speed?

General SCHRIEVER. Now, here again I agree entirely with what General Irvine said, that we have more capacity, really, than probably we will have need for this particular missile, and it depends a great deal as to how many missiles the NATO countries will need, if they accept any.

This is a matter that I cannot answer on it, sir.

Mr. VANCE. If they need more, you can get them out on time?

General SCHRIEVER. We can get them.

Mr. VANCE. Now, with respect to the Titan, this has been touched on before today, but perhaps you might like to amplify why the Air Force is developing both the Titan and the Atlas.

General SCHRIEVER. Well, this again stemmed largely from the advice of our Scientific Advisory Board, which incidentally we con-

tinued to have advice in an advisory capacity to the Air Force after they had made their initial recommendations in early 1954.

Their feeling was very strong that there were sufficient technical risks involved and the ICBM program was so important that we ought to initiate two technical approaches to the problem.

They also felt that from a competitive standpoint this would be good, both technically and just competition among industry.

Also, they did form a backdrop. As I think Mr. Horner pointed out, or General Irvine, whereas the subsystems are not immediately interchangeable, if we had difficulty in one major subsystem, say for the Atlas, with some modification, the subsystem, say guidance propulsion, could be substituted for the Titan and for the Atlas.

One other thing which was an advantage which we didn't recognize just at the time when we initiated the IRBM program, the Thor, we only added one new contractor to the program, the total program, and that was Douglass, and all of the subsystems were taken from the then existing ICBM program.

Mr. VANCE. Speaking of backups, do you agree with General Irvine's testimony, as I understood it, that Thor and Jupiter are not necessarily backups for one another?

General SCHRIEVER. Yes; I agree that at this stage of the game I do not think that they are backups of the kind that we should pay that much insurance for.

Mr. VANCE. In other words, you think that the funds could be used elsewhere more profitably?

General SCHRIEVER. I do.

Mr. VANCE. Now, with respect to the operational employment of IRBM's, would you care to add anything with respect to the Air Force's concept regarding the movability of our IRBM's?

General SCHRIEVER. I do not believe there is much more to add. Both the Jupiter and the Thor, from the standpoint of ground support equipment, are essentially the same kind of weapon. I think a Ford-Chevrolet comparison is a pretty good one. All of the ground support equipment that we have in our system is on wheels. Our system is movable. We have developed a very flexible operational concept. The equipment is geared to that flexible concept, and I do not want to go into the details of it now, but I can assure you that we are not fixed in concrete with the Thor.

Mr. VANCE. In your opinion, will the necessary facilities for the employment of the IRBM's be available?

General SCHRIEVER. Yes; they, of course, have to be deployed overseas, and this is dependent upon satisfactory negotiations with the countries involved, but there are not very large-scale facilities required for the deployment of the Thor.

Mr. VANCE. Now, with respect to the ICBM and bases for ICBM's, there has been some testimony today that it takes about 18 months of construction time. Does it not sometimes actually take longer than that, however, to get a base authorized and to get the construction done?

General SCHRIEVER. Yes. I think that, probably, a little elaboration is required here.

Mr. VANCE. Please do.

General SCHRIEVER. Because, in essence, in the ICBM program we are, in effect, establishing or developing a new operational environment. We just cannot move into an existing base, except the support base where the people are housed. The facilities required for launching and maintenance of these missiles, the communications, and so forth, are quite different from anything that is in existence, so, this means that we have a lot of planning to do, establishing of technical criteria, master planning for the site, before we can ever get to the point of starting construction. So that, actually, the lead time, from the time you select a site, is more like 36 to 40 months than it is the 18 months' construction time, because of these other factors that are involved.

Mr. VANCE. In other words, it may be necessary to come to the Congress and get approval for getting the necessary land on which to put the base?

General SCHRIEVER. Yes. Fortunately, the amount of land required for the facilities themselves is not very large, and we are attempting to go to existing bases where support facilities are already in being.

Mr. VANCE. Do you feel that the program with respect to the establishing of bases for ICBM's is moving along as fast as it could?

General SCHRIEVER. It is moving in phase with the operational program that has been approved.

Mr. VANCE. Suppose a decision is made to accelerate the production of ICBM's. Will it then be in phase?

General SCHRIEVER. We would have to select additional sites.

Mr. VANCE. And isn't the lead time longer, however, with respect to the getting of bases than it is with respect to getting production?

General SCHRIEVER. One point here is that we have already had a number of site-selection boards out, and we have some other sites that are, you might say, in our hip pocket, so that we would not have to go through exactly the same site-selection process to get a couple of more sites, for example.

Mr. VANCE. Now, with respect to personnel training, does that come within your responsibilities, General Schriever?

General SCHRIEVER. This will be part of the total management job, but it will be under the SAC, under the Strategic Air Command Office there along with the training command which also has a very sizeable liaison office located with us on the west coast.

Mr. VANCE. Could you tell us what the Air Force has done to date to train crews to operate the Thor and Atlas and Titan?

General SCHRIEVER. We have established complete personnel requirements, for example, just exactly the quality of the personnel required to operate and maintain the missile. We have initiated training programs with the various contractors, this in phase, of course, with the time at which the units will be made operational. We have a complete training program laid out, approved, and underway for the Thor, for example.

Now, we will have to take some rather unusual steps for the initial Thor units, but we will be back in phase again after about the first unit or so.

Mr. VANCE. And would you care to comment on those in open session or would you rather do that in closed session—the unusual steps?

General SCHRIEVER. The unusual steps are in line with what General Irvine stated. We are getting people that are highly qualified that we can train fast and we are taking these special steps to get them trained more quickly than if you put them through a more normal training program.

Mr. VANCE. Then as I understand your testimony, you actually have started to train crews to handle these weapons?

General SCHRIEVER. We have started to train individuals. The crews—I mean they will be brought together as crews a little later.

Mr. VANCE. In your view, will there be sufficient trained personnel ready to man the weapons when they come off the production line?

General SCHRIEVER. We will have an all-military organization for the first unit overseas at the end of 1958.

Mr. VANCE. Finally, General Schriever, could you tell us what bottlenecks or impediments exist with respect to the ballistic-missile program which you are in charge of?

General SCHRIEVER. I would say that today there are no bottlenecks or impediments to getting the job done that are administrative or monetary in nature. It takes time to do certain things, and we are trying to do it as fast as we can. There were inhibitions during—

Senator JOHNSON. In your opinion, are you getting it done as fast as you can?

General SCHRIEVER. Yes, sir. I am sure that you could find a place or two where there could be some improvement. You cannot run a program this big that is perfect.

Senator JOHNSON. Are you looking for those places?

General SCHRIEVER. Sir?

Senator JOHNSON. Are you looking for those places?

General SCHRIEVER. Yes, sir. I think our management is such that we try to find the soft spots. Our whole control system is made up, is based on just finding those things that are soft, and trying to do something about it before they really have got us over a barrel. Now, we have had a lot of difficulties in the program, the early phases of the program primarily in the facilities area. Facilities are the hardest thing to get first approved and then get built on time, because you are subject to so many things that you have only a relatively small amount of control over, like strikes.

The steel strike, for example, hurt us very badly on our facilities at Patrick. Things of that nature; these are the things we try to get on top of, get on top of quick and do something about.

Senator JOHNSON. And is it your testimony that you are working as quickly and as effectively as you would work if the whistle had already blown and the results of your efforts would determine whether we would survive or not?

General SCHRIEVER. I do not want to answer that just "Yes" or "No" because I don't think this—

Senator JOHNSON. If you did, you would answer it "No," would you not?

General SCHRIEVER. If I said forthright today I think I would answer it "Yes."

Senator JOHNSON. Fine. That is encouraging.

General SCHRIEVER. But we started—

Senator JOHNSON. If it is accurate, it is very encouraging.

General SCHRIEVER. We started this program in 1954 and we really built up a tremendous momentum, and management of industry were called in to the Pentagon. We had meetings with them and we dealt with the top management of each of these companies. They were highly motivated to get this job done just as quickly as they possibly could.

Now, during this past year there has been this economy wave, and I am fully familiar with how these things operate in this country, and we had to make certain adjustments in the program, and we applied all kinds of controls of one kind or another. These are inhibitions. They are psycholological many times. But nevertheless you lose a certain amount of momentum.

I think that the urgency has again been picked up with the sputnik, and I am sure that we are——

Senator JOHNSON. The inhibitions are gone and you are operating full steam?

General SCHRIEVER. That is right.

Senator JOHNSON. And you are convinced that you are operating as fast and as effectively and as efficiently as you would even if you were already at war?

Now, what does Convair have to do with your operation?

General SCHRIEVER. They are the major assembly and test contractor for the Atlas missile.

Senator JOHNSON. Do they have any knowledge about what is going on out there?

General SCHRIEVER. Knowledge of what is going on where?

Senator JOHNSON. In connection with their work on missiles.

General SCHRIEVER. I should think they did; yes, sir.

Senator JOHNSON. Are they reputable people?

General SCHRIEVER. Yes, sir.

Senator JOHNSON. Can you believe them?

General SCHRIEVER. Yes, sir.

Senator JOHNSON. Would you like to hear what they told us on December 9?

General SCHRIEVER. Yes, sir.

Senator JOHNSON (reading):

Greater sense of urgency must somehow be engendered in the minds and reflected in the action of everyone in the Government and throughout the hundreds of industrial organizations directly involved in the accomplishment of the Atlas program.

A greater sense of urgency must be engendered.

That is December 9.

They continue:

The vast majority of the people concerned with the Atlas program are unaware of either the magnitude of the Soviet's technical progress or the imminency of the U. S. S. R. operational intercontinental ballistic missile. Therefore, it is recommended—

speaking to this committee ideas, on the 9th, the people who are building the Atlas said—

That a more general dissemination of information as to what the Soviets are doing in the ballistic-missile field be accomplished. Such a program of education would lend an appropriate sense of urgency to all concerned.

It is further recommended that technical intelligence as to the Soviet approaches and rates of progress in the ballistic-missile field be formally disseminated through the establishment of a system for the purpose of sharing of such technical information of Soviet progress with contractors concerned with our own ballistic-missile program which would certainly help accelerate the development of our own missile.

We cannot accelerate it if we are going as fast as it is possible to go.

One further point in the matter of assembling information. Intercommunication of technical information between programs within our own Defense Department could be improved.

Do you agree to that:

The dissemination and intercommunication of technical information between the programs within our own Defense Department could be improved.

Do you agree to that?

General SCHRIEVER. Our dissemination of information between the Army and the Navy in the ballistic-missile area, I think, is very good.

Senator JOHNSON. You don't think it could be improved?

For instance, abandonment of the need to know restrictions and reduction of security in this regard to a level of secrecy throughout the missile program would expedite such communication.

As it now is much information useful to those active in the development of missiles is unavailable to them, because they don't even know it exists, and the people who do know it exists apparently are unaware that it can be helpful in developing acceleration of our missile program.

In the light of recommendations 1 and 2, it is further recommended that plans be developed immediately for higher rate of Atlas missile production, faster development of launch complexes, and faster activation of more active missiles.

I am greatly encouraged by the testimony you have given here.

It may be that those statements I have read are just a lot of words and their recommendations are not sound, but I wanted you to have the benefit of them, so you could take them into consideration when you consider whether or not we are in as much of a hurry as we can get in. It could be that it might be later than we think?

General SCHRIEVER. Let me say this, and I will stake my reputation on it.

That you can get Mr. Dempsey up here, and if he will testify that he can accelerate the Atlas research-and-development program, I would be very much surprised.

Now what he did say about production and accelerating the buildup of the force I agree with, and I stated that we had a greater capability.

Insofar as some of the other things that he mentioned in the letter about a sense of urgency, it seems to me either the people have been reading nothing but sputniks and ICBM's and whatnot, and I don't know what it takes to give them a sense of urgency if they don't already have it.

So this is in my opinion a matter of opinion.

As far as his having or their having any complaints about not getting everything they need to get on with the job, I have told both Mr. Dempsey and General McNarney that my door is always open and my phone is always on the table and they can always call me, and this is the first time I have heard some of this that they have written in the letter there.

Senator JOHNSON. I think that is one of the good things about this democratic system.

General SCHRIEVER. This is fine, but I think they ought to tell me about it too.

Senator JOHNSON. We can bring you together with the contractor and let you have an exchange of views. That is one thing they complained about, that you do not disseminate information.

We are disseminating it here and if you will take it in your stride, you can find out what they think about you. I guess they will read this record and they can find out what you think about them.

General SCHRIEVER. I think they are a fine organization and they have done a very fine job, and I have the highest regard for General McNarney and Mr. Dempsey.

Senator JOHNSON. I want to call this to your attention.

I think if that whistle blows and these Russians take after you, that you are going to be operating at full capability and you are going to be up here just as quickly as a plane can get you pounding your fists on the table telling us "Let me go full steam ahead," I am just trying to see if you won't make that recommendation tonight.

Now here are the North American people that make the engine. They say that overtime has been limited to 2 percent under directives that were in force when this project was initiated.

General SCHRIEVER. That is not true.

Senator JOHNSON. There has been no change in this limitation up to the present time.

Well, Do you mean these people, the contractors do not tell the truth?

General SCHRIEVER. That statement that they are limited to 2 percent is not the truth.

Senator JOHNSON. Do you know a fellow named Kindelberger, chairman of the board?

General SCHRIEVER. Yes, sir, I do.

Senator JOHNSON. Is he a reputable man?

General SCHRIEVER. That is not a true statement, as it relates to our program.

Senator JOHNSON. Do you believe he is a reputable man?

General SCHRIEVER. Yes, sir. I don't know who wrote the letter for him. It is not true.

Senator JOHNSON. He says:

Overtime has been limited to 2 percent under directives in force when this project was initiated. There has been no change in this limitation up to the present time.

That was December 10.

General SCHRIEVER. It is not true.

Senator JOHNSON. It looks like you are doing business at the same old stand.

General SCHRIEVER. No, sir.

Senator JOHNSON. That got us behind.

General SCHRIEVER. There has never been a 2-percent overtime restriction imposed on North American on the engines for the ICBM or IRBM programs.

Senator JOHNSON. You speak with a positiveness.

General SCHRIEVER. Yes, sir.

Senator JOHNSON. And so does Mr. Kindelberger.

I wonder if you could not do this: You get together with him between now and January 6 and also these Convair people.

General SCHRIEVER. I certainly will.

Senator JOHNSON. And in those conferences give them some of that good Texas A. & M. spirit that they had most of this year up until the last few games at the end, and let us see if we cannot catch up with these Russians and really get ahead of them and make us all feel good.

General SCHRIEVER. I will have a meeting with him, you can be assured of that. [Laughter.]

Senator JOHNSON. I hope it is a pleasant meeting, and that it will be an effective one.

Any other questions, Counsel?

Mr. VANCE. Do you have anything further you want to add, General?

LOOKING TO FUTURE BALLISTIC MISSILES

General SCHRIEVER. Well, I did have something else I would like to add.

Mr. VANCE. Please go ahead.

General SCHRIEVER. It has been touched on by Mr. Horner, but I would just like to add my comments to this:

First of all, we have been very busy looking into a future generation of ballistic missiles because what we are developing now is the first generation, and they are going to be model T's 10 years from now, and it will be one of the things that we will have to be getting into, not that we haven't already been doing a lot of work in component development, but within the next 12 to 18 months a large-scale program of second-generation ballistic missiles is certainly in order.

Another thing I would like to make a statement on that has to do with the satellite and space-vehicle programs, space-technology programs.

I made a talk in San Diego in February of this year in which I stated that about 90 percent of the developments in the ballistic-missile program can be applied to advancing in space, satellites and other vehicles.

We have developed a program which looks toward the next 10 years in this area. I think a very vigorous program in this area is required.

I also want to add my comment about streamlining the decision-making process at the DOD level. They set up the committee there, the OSD Ballistic Missiles Committee, and it functioned very well for awhile during which time the major members of the committee were present.

But then the alternates started coming in, and then things went the usual way again.

We need program stability. During this past year I spent close to 200 days on temporary duty, a lot of it dealing with presentations on 1 program or another program. It is a wonder I still have a wife left.

I think we need an enlightened viewpoint on research and development of components, subsystems such as propulsion units, other things, radar, and so forth, that do not have an immediate weapons-system application.

We, I subscribe a hundred percent to what General Putt said or Mr. Horner said, that we need to gamble more on the development of

things that you can't see an immediate application for. This takes more money.

These are some of the things that I think are extremely important.

One last item, and I cannot stress this too much because there is a great deal of discussion about how we organize research and development in this country.

My feeling is that if you ever separate research and development of military weapons from the user, that instead of compressing time, you are just going to extend the time, because you have got, the user has, to be part of the total management team, just like we are out in my organization today.

This is the only way in which you can compress time from the initiation of development to the time that you put it into operational use.

So this is one reason that I want to put a strong negative on this proposed Advanced Research Project Agency that I have been reading something about in the newspapers, because if it does become—

Mr. VANCE. This is the one that is to be set up in the Department of Defense.

General SCHRIEVER. If it does become an operating management agency, I think it will be a very serious mistake.

Mr. VANCE. Thank you very much, General.

Those are all the questions, Mr. Chairman.

Senator JOHNSON. Senator Bridges?

Senator BRIDGES. No questions.

Senator JOHNSON. Senator—

Senator BUSH. Is it mine? I am sorry.

Senator JOHNSON. Senator Stennis?

Senator STENNIS. I have no questions.

Senator JOHNSON. Senator Bush?

Senator BUSH. What did you mean by 200 days of temporary duty? I did not quite get the implication of that.

What is temporary duty in the way that you used it there, General?

General SCHRIEVER. When I have to leave my permanent station, which is the west coast, and I am on orders, on temporary-duty orders, and I took a check on how many days I had been gone through the 19th of November. It was 160 days up to that time, and since that time I have been gone almost constantly. So it is going to end up almost 200 days, which is quite a lot of the year.

Of course, this has been a little worse than others.

[Laughter.]

Senator BUSH. Nothing further.

Senator JOHNSON. Senator Barrett?

Senator BARRETT. General Schriever, I want to commend you for your splendid statement here this afternoon. I was quite interested in the statement with reference to the manned satellite. I would like to ask you if that is presently authorized, or would you have to come to the Congress for budget funds?

General SCHRIEVER. There is no manned-satellite program authorized at this time. I would prefer not to say anything more about the program that has been under discussion, which Mr. Horner covered, because of its classification.

Mr. WEISL. I think the Senator is talking about the X-15 which was discussed.

General SCHRIEVER. Oh, this is not a satellite. This is a rocket-propelled experimental airplane.

Senator BARRETT. Yes; I understand that, General, but I was thinking about an extension of the X-15, and it would be perfectly agreeable to wait for executive session.

General SCHRIEVER. Well, I think I can say something about certain things that appear possible in the not too distant future with the hardware that is now in the ballistic-missile programs.

Senator BARRETT. That is what I had in mind.

General SCHRIEVER. You can take the Thor, the Jupiter, the Atlas, and the Titan, and they all make perfect boosters, some of them better than others, and there is existing hardware for second stages available today that would put into orbit considerably greater weights than we are talking about in our current satellite programs.

TO THE MOON BY 1959

And these could then be followed by experimental recovery flights initially. You could even get to the moon by 1959.

Senator BARRETT. But there is no fund provided for such work?

General SCHRIEVER. Well, this program is in the process of being formulated at the present time. I don't even know who is going to manage it at the moment.

Senator BARRETT. That is all, Mr. Chairman.

Thank you, very much.

Senator JOHNSON. Any other questions?

Counsel?

Mr. VANCE. No further questions, Senator.

Senator JOHNSON. General Schriever, the program you command is of great vital importance to this Nation, and the chairman wishes to express the deep appreciation of this committee for your patriotic service and for your loyal and dedicated effort and for your having come here today and given the committee the benefit of your wide experience in this field.

We thank you very much, and we no doubt will be more than willing to meet with you again and check up on the development and the progress that we are able to make.

We have been relying on your associate, General LeMay, for many years to protect us, secure us, and I guess his shoulders are still broad. If we give him a little help now and then, why we can hold things off until you get ready, but we do want you to give him a hand.

General SCHRIEVER. We are going to get there as soon as we can.

Senator JOHNSON. I heard a distinguished member of the military branch say that when he came back from delivering the A-bomb over Hiroshima and talked to his research people that they told him that a few years, maybe 5, 10, they would not need any manmade bombers, that the missiles would be ready to take over and save a lot of American boys' lives.

That has been some 12 years ago, and some people think we are still as far away as we were then. But sputnik has kind of changed that

thinking, so we want to make whatever contribution we can to expedite the program.

You are excused, General Schriever, and we thank you very much for coming here.

General SCHRIEVER. Thank you.

Senator JOHNSON. The Chair has a brief statement he would like to make before concluding.

The committee will be in recess until January 6. Meanwhile, the staff and individual committee members will be working around the clock collecting information in preparation for the next series of hearings.

We plan to have distinguished production men and scientists present their views during the next set of hearings. We will probably also have a review of the testimony taken thus far by the Defense Department.

I doubt whether ever before has there been assembled such a distinguished group of military leaders, scientists, and production men to lay the facts right on the table for the American people. Their testimony has been broad and far reaching.

Some of them have urged an independent civilian commission to supervise missile, satellite, and space efforts. They have called for more funds.

There has been testimony that artificial shackles should be taken off missile workers who are compelled to go home at the end of 40 hours.

Some have called for a permanent, competent, and adequate staff to provide leadership in basic and applied research at the Department of Defense level.

It has been urged that research-and-development programs should be on a 3-to-5 year basis instead of the current annual basis. It has been generally agreed that contractors should have more leeway to make technical decisions.

It has been agreed that lead time should be reduced by making firm and early decisions.

The facts on our strengths and weaknesses have been spelled out.

Witnesses have called for speedup in production of the B-52, a dispersal of SAC bases, and provisions for more tankers to fill the gap until the weapons of the future become available.

It has been urged that there be more authority for those directing the missile programs.

A clearinghouse has been suggested to end overlapping and assure cooperation between missile men inside and outside of the defense services.

It has been suggested that manufacturers be given adequate incentives to efficiency by penalizing when they fail.

There has been universal stress on the need for programs that raise our educational level.

It has been suggested that the pay scales of the armed services be revised.

All of these suggestions will receive serious consideration. The situation is grave and warrants the most thoughtful, prudent approach that can be taken. There has been some discussion of a committee report. The committee is making a report every day when it presents

the facts to our people—all the facts that discerning counsel and inquiring Senators can ascertain.

The basic point is to bring forth the facts which illustrate the need for a sense of urgency.

Since the committee announced its hearings some decisions have been made and others have not been made. We recognize that all of them are difficult, as there is no simple answer in this highly complex field.

We are not looking for a scapegoat or for someone to blame. This is a time when we need the help of every American who has something to contribute. We cannot work together in unity to overcome the common peril if we spend our time denouncing those who may have made wrong decisions or who may simply have been victims of circumstances.

There is not enough time to get even. We have to spend our days and our nights trying to get ahead.

It is up to all Americans to work as though there will never be a tomorrow and everything must be done tonight. We have a long way to go and we must start at the earliest possible moment.

I wish to thank the members of the committee, the committee staff, and the witnesses. This has been a difficult set of hearings. I am proud of the way in which all have conducted themselves.

I think that all of us remember the day after Pearl Harbor. There were no internationalists and no isolationists; no Republicans and no Democrats. There were just plain Americans eager to get at the job.

We now face a situation which in some respects is comparable to a Pearl Harbor. I will always be proud of the fact that the members of this committee, both majority and minority, have conducted themselves as Americans trying to get a job done.

The committee will stand in recess until January 6 at 10 o'clock.

(Whereupon, at 8 p. m., the committee recessed, to reconvene at 10 a. m., Monday, January 6, 1958.)

INQUIRY INTO SATELLITE AND MISSILE PROGRAMS

FRIDAY, JANUARY 10, 1958

UNITED STATES SENATE,
PREPAREDNESS INVESTIGATING SUBCOMMITTEE
OF THE COMMITTEE ON ARMED SERVICES,
Washington, D. C.

The subcommittee met, pursuant to recess, at 10 a. m., in room 212 Senate Office Building, Senator Lyndon B. Johnson (chairman of the subcommittee) presiding.

Present: Senators Johnson (Texas), Kefauver, Stennis, Symington, Saltonstall, and Flanders.

Also present: Senators Ervin, Smith (Maine), Case, and Barrett, members of the Committee on Armed Services.

Edwin L. Weisl, chief counsel; Cyrus R. Vance, counsel; Gerald Siegel, associate counsel; Solis Horwitz, associate counsel; Daniel F. McGillicuddy, associate counsel; Stuart P. French, associate counsel; Dr. William Houston, consultant; Dr. Homer Joe Stewart, consultant; and Edward C. Welsh, staff adviser.

Senator JOHNSON. The committee will come to order.

Our first witness this morning will be Mr. Nelson A. Rockefeller, president of the Rockefeller Brothers Fund, Inc.

Mr. Rockefeller is well known to the members of this subcommittee, and well known to the people of the United States. He is a member of a distinguished family which, through the past two generations, has devoted its life to public service and to securing the well-being of the people of the United States and the people throughout the world.

During World War II and the period subsequent thereto, Mr. Rockefeller has had a distinguished career in the Government service. He has been greatly interested and served our country in the diplomatic field.

He headed a distinguished and most able Commission to Study the Organization of our Department of Defense and many of his recommendations have already been put into practice. He has also served ably as Under Secretary of the Department of Health, Education, and Welfare.

Under his chairmanship the Rockefeller Brothers Fund is making an intensive study of the problems of our international security.

Just on Monday of this week the fund released its study on the military aspect of this problem.

Mr. Rockefeller has graciously agreed to appear before the committee this morning to discuss with us the recommendations of his group and the reasons why those recommendations have been made.

(Mr. Rockefeller's biography is as follows:)

BIOGRAPHY OF NELSON ROCKEFELLER

Nelson Rockefeller, philanthropist and adviser, was born in Bar Harbor, Maine, on July 8, 1908. He received his bachelor of arts from Dartmouth College in 1930. He is a Phi Beta Kappa.

He has been a director of Rockefeller Center, Inc., since 1931; president in 1938-45 and 1948-51, and chairman from 1945-53. He was Coordinator of Inter-American Affairs in 1940-44 and Assistant Secretary of State in 1944-45.

He served as chairman of the International Development Advisory Board (point 4 program) in 1950-51, and as Under Secretary of Health, Education, and Welfare in 1953-54.

He was a special assistant to the President from 1954 to 1956. He is president of the Rockefeller Brothers Fund and since 1956 has been chairman of a project studying various problems of national life.

He also has been president of the American International Association for Economic and Social Development, the International Basic Economy Corporation, the Museum of Modern Art, the Museum of Primitive Art, and chairman of the board of directors of the Government Affairs Foundation.

He has received many awards for his dedicated efforts in national affairs and international relationships.

Senator JOHNSON. Mr. Rockefeller, it is customary for the committee that we ask each witness to take the oath.

Would you please stand and raise your right hand?

Do you solemnly swear the testimony you give this committee will be truth, the whole truth?

Mr. ROCKEFELLER. I do.

TESTIMONY OF NELSON A. ROCKEFELLER, PRESIDENT OF THE ROCKEFELLER BROS. FUND, INC.

Senator JOHNSON. Be seated, Mr. Rockefeller.

It is a pleasure to welcome you to this meeting, Mr. Rockefeller. I have been associated pleasantly with you in Government service throughout the years.

I know each member of this committee is delighted that you have seen fit to assume responsibility for this study, and is grateful for your willingness to come here and to counsel with us on it.

We would like to have you make a preliminary statement. At the conclusion of that preliminary statement the counsel will interrogate you.

At the conclusion of the counsel's interrogation each member will question you, if he so desires, not to exceed 10 minutes. When we conclude with all members, we will go around again if we need to.

If at any time you would care to have a short recess of 5 or 10 minutes, if you will notify the Chair, we will be delighted to accommodate you.

We are pleased to have you and will you proceed with your statement?

Mr. ROCKEFELLER. Thank you very much indeed, Senator, and members of the committee.

I appreciate very much the opportunity of appearing here on behalf of the members of the panel of the special studies project which have been working on this and other problems and opportunities affecting our country.

If I may, Mr. Chairman, I would like to just review briefly the

structure of this group and the high spots of the considerations and the urgency which they felt in presenting this particular report.

Senator JOHNSON. Just proceed in your own manner.

Mr. ROCKEFELLER. Thank you very much.

AIMS OF THE PROJECT

Well, this project was organized to explore the problems and opportunities with which the United States will be faced in the next 10 to 15 years, to review our national purpose and objectives in terms of these problems and opportunities, and to develop a framework of concepts and considerations on which policy decisions to implement our purpose may be based.

To undertake this study we organized a bipartisan panel of 30 members representing a cross-section of American life. We then set up seven subpanels to concentrate on special areas, United States international objectives, the military aspects of international security, foreign economic policy, domestic economic and social objectives, education and manpower, the democratic process, its challenge and opportunities, and the moral framework of national purpose.

The group commissioned over a hundred papers by leading experts in various fields on these subjects. On each of the 7 subpanels which were established there were 4 members from the overall panel and 10 to 15 additional specialists in each of these fields so the total number of people involved runs to approximately 150 and they have been working together now for almost a year and a quarter.

The first study to be issued was the one on military aspects of international security. I would like to stress that this represents only one aspect of international security, as we saw it, and that we will develop in other reports the political, economic, and human aspects of our international relations, which are equally important to the future security of the free world.

This first report to be issued was prepared by a subpanel of 20 members and reviewed at various stages by the overall panel which went over the final draft in full committee. Thus, the conclusions represent a consensus of the thinking of some 50 people who strongly urge the implementation of its recommendations.

With your permission, I should like to give the highlights of this consensus. It represents the collective judgment and deep convictions of this group of citizens who feel that it is essential that major steps be taken now to insure survival.

In the words of the report—

power alone will not supply an answer to the challenge of the future. It does offer the prospect that there will be a future.

Our goal is a world under law; our aspiration is an international community from which the threat of war has been removed and based on respect for individual and national dignity. But we will not realize these aims unless we are prepared to make the effort required to survive.

It is our judgment that all is not well with present United States security policies and operations. The overall United States strategic concept lags behind developments in technology and in the world political situation. In major respects, defense organization is unrelated to critically important military missions.

1. The roles and missions assigned to the individual military services have become competitive, rather than complementary because they are out of accord

with both weapons technology and the principal military threats to our national safety;

2. The present organization and responsibilities of the Joint Chiefs of Staff preclude the development of a comprehensive and coherent strategic doctrine for the United States;

3. The Secretary of Defense is so burdened with the negative task of trying to arbitrate and control interservice disputes that he cannot play his full part in the initiation and development of high military policy.

Systems of budgets, appropriations, and financial management are out of gear with the radically accelerating flow of military developments.

The United States system of alliances must be adapted to the constantly changing strategic requirements.

The United States is rapidly losing its lead in the race of military technology.

With respect to civil defense, the main feature to note is that it is long overdue. It does not make sense for the free world to engage in a major military effort without at the same time protecting its most important resource: its civilian population.

LAG REFLECTS NATIONAL COMPLACENCY

We believe that the security of the United States transcends normal budgetary considerations and that the national economy can afford the necessary measures.

We believe that the United States lag in missiles and space machines, however worrisome, is a symptom and not a cause. It reflects our national complacency over the past dozen years. It is vitally important to the United States to calculate its security requirements on an integrated and long-range basis, and set about correcting all deficiencies.

This report concludes that we can afford what has to be done to assure our security; and indeed that we cannot afford less. We feel that we can achieve the necessary military power while preserving and expanding other elements of our strength, such as health, education and economic growth.

We recognize that this will require great exertion, but although the leadership of a democracy is a far more exacting task than the direction of a police state, the power which is generated by the voluntary effort of a free people cannot be equalled by the reluctant compliance of subject nations.

Mankind is yearning to realize its aspirations in peace, but it is faced by two somber threats, the Communist thrust to achieve world domination which seeks to exploit all dissatisfactions, and to magnify all tensions; and the new weapons technology capable of obliterating civilization.

Force alone will not supply the answer to the hopes of humanity. Yet our strength effectively mobilized can help bring about a framework of security in which these aspirations may be realized in freedom and without fear.

Ever since World War II, the United States has suffered from a tendency to underestimate the military technology of the U. S. S. R. In the military field the technical capability of the U. S. S. R. is increasing at a pace obviously faster than that of the United States. Soviet military strength poses a major threat to all countries of the free world. If not reversed, this trend alone will place the free world in dire jeopardy.

It appears that the United States is rapidly losing its lead over the U. S. S. R. in the military race. For perhaps the next 2 years, we still possess a superiority in strategic striking power, and any Soviet attack on us would meet a crushing reply. But our position a year or two hence depends on decisions which must be taken immediately.

Unless present trends are reversed, the world balance of power will shift in favor of the Soviet bloc. If that should happen, we are not likely to be given another chance to remedy our failings. However, it is emphatically not too late if we are prepared to make the required big effort now and in the years ahead.

The growing complexity of modern technology, the foreseeable rise in the cost of maintaining weapons systems, and the interdependence of foreign policy and military capability make it clear that our future security, which is to say our survival as a nation, will require a far more efficient system for military planning and military decisions.

Starting immediately, defense expenditures must be increased substantially over the next few years. Testimony indicates that current deficiencies in our strategic posture require additional expenditures each year of approximately \$3 billion for the next several years.

This does not include necessary increased appropriations for mutual assistance and for civil defense. Because we must maintain our present forces as we go into production on new weapons, such as missiles, the cost of military programs will continue to rise until at least 1965.

The price of survival then is not low. This panel is convinced, however, that the increases in defense expenditures are essential and fully justified, provided that the greater expenditure is coupled with increased efficiency. We can afford to survive.

In a conflict between despotism and freedom, it would be immoral were we to shrink from an adequate defense of the values for which we stand. The very shrinking may serve to precipitate armed conflict. We are engaged in the phase of global struggle which has come to be known as the cold war.

In this report we have tried to set forth measures which we feel are imperative in the interest of national security. We consider them essential if we are to reduce the likelihood of war and to make sure that if in spite of all our efforts war should be forced upon us, we shall not be overwhelmed by it.

The basic problem of American strategy is the ability to make effective choices. This will depend on the courage and sense of purpose of our leadership, the effectiveness of the organization of our Government and on the spirit of our people.

When the security of the United States and of the free world is at stake, costs cannot be the basic consideration. The cold war cannot be won and a "hot" war cannot be avoided without a major effort. This is clearly not time for complacency; it is just as clearly not time for hysteria.

What is required throughout the country is an attitude of sustained and informed determination. If this report—

Mr. Chairman—

makes a contribution to the emergence of such an attitude, it will have served its purpose.

Thank you.

Senator JOHNSON. Mr. Rockefeller, the committee thanks you for your statement. I observed it contained two very important references which appeal to me. One, if we are to have a future, decisions must be made. Two, military expenditures must be materially increased.

I hope during the counsel's examination it will be put into the record whether in your opinion the necessary decisions have been made and whether in your opinion the necessary military expenditures have been approved.

Counsel, will you proceed with your examination?

PANEL INCLUDED DISTINGUISHED CITIZENS

Mr. WEISL. Mr. Rockefeller, on your study panel you had a cross-section of distinguished citizens representing various fields of the life of the Nation; did you not?

Mr. ROCKEFELLER. We did, sir.

Mr. WEISL. And among those representatives, were Gen. Frederick L. Anderson, former Deputy United States Special Representative in Europe; Gordon Dean, former Chairman of the Atomic Energy Commission; James B. Fisk, executive vice president of the Bell Telephone Laboratories; and I believe Mr. Fisk is now serving on one of the President's commissions, is he not, Mr. Rockefeller?

Mr. ROCKEFELLER. I think that is correct.

Mr. WEISL. What commission is that?

Mr. ROCKEFELLER. The President's Science Advisory Committee.

Mr. WEISL. With the staff.

You also had General Gaylord, former general in the Air Force;

Roswell L. Gilpatric, former Under Secretary of Air; Ellis A. Johnson, Director, Operations Research Office.

What wartime position did Ellis Johnson hold, Mr. Rockefeller?

Mr. ROCKEFELLER. I do not know, Mr. Counsel, but I might comment that this Operations Research Office does research contract work for the Army, and it is centered at Johns Hopkins University, so that his contacts with the military are very intimate.

Mr. WEISL. You also had Col. George A. Lincoln, professor at the United States Military Academy; Gen. James McCormack, vice president of the Massachusetts Institute of Technology. He also held a position during the war, did he not, Mr. Rockefeller?

Mr. ROCKEFELLER. He held a number.

Mr. WEISL. What positions did he hold, please?

Mr. ROCKEFELLER. He was Director of Research and Development, the United States Air Force, and former Director of Military Applications, United States Atomic Energy Commission. He served and he is now serving as president of the Institute of Defense Analysis, which is the financial and administrative organization for the Weapons System Evaluation Group, which is an independent organization of five universities doing studies for the Joint Chiefs of Staff.

Mr. WEISL. You also had until his unfortunate death Frank C. Nash, who represented the United States at the General Assembly of the United Nations, who was the President's consultant on overseas bases, and also served in the Defense Department.

You also had Prof. Edward Teller and Carroll L. Wilson, who was General Manager of the Atomic Energy Commission.

Would you please tell the committee what your method of operation was?

Mr. ROCKEFELLER. Well, gentlemen, as I mentioned, we had papers commissioned by experts, people who had knowledge and authority in the various fields. These papers were then presented to the subpanels as well as to those members of the overall panel who cared to have them.

They were then read and discussed, often presented by the author at a meeting for discussion. They were commented on by two people who were prepared to comment in advance to lead the discussion and then a full discussion of the committee was had.

With this background the committee then proceeded over a period of months, finally breaking up into subcommittees, where the various individuals—there were 20, I think, in all on this committee—who had special competence, started to draft their area of the final recommended report.

Mr. WEISL. And prior to issuing your report you held meetings for approximately a year and a half; did you not?

Mr. ROCKEFELLER. That is correct, sir.

Mr. WEISL. And you heard witnesses?

Mr. ROCKEFELLER. That is correct, sir.

Mr. WEISL. And these witnesses represented the military?

Mr. ROCKEFELLER. As well as scientific and other groups.

Mr. WEISL. Scientific, educational groups, economists, businessmen, industrialists, and others.

What were your conclusions as to the relative military posture of the United States compared with the Soviet Union?

Mr. ROCKEFELLER. Well, our conclusion was, as I read, that as of today we have superior strength but that in the foreseeable future if trends in weapons technology and development continue as at present that might be reversed.

We have the lead as of today.

Mr. WEISL. And in your conclusions this statement appeared, Mr. Rockefeller, did it not?

Thus it appears that the United States is rapidly losing its lead over the U. S. S. R. in the military race. For perhaps the next 2 years we still possess a superiority in strategic striking power, and any Soviet attack on us would meet a crushing reply. But our position a year or two hence depends on decisions which we must take immediately.

Mr. ROCKEFELLER. That was the conclusion of the panel.

Mr. WEISL. Now, what decisions did your panel recommend that we must take immediately?

Mr. ROCKEFELLER. Well, those decisions, Mr. Counsel, were divided in various parts, decisions relating to organization, and decisions relating to budgetary matters, and decisions relating to our alliances and ties with nations abroad.

I should be glad to run through those, if you would care to have me, in detail.

Mr. WEISL. Would you be kind enough to do so, Mr. Rockefeller.

Mr. ROCKEFELLER. Well, perhaps I could start with the reorganization of the Armed Forces structure.

As the report said basic changes in our defense organization are recommended to correct the inefficiency and duplication of effort growing out of interservice rivalry, and if I may, Mr. Counsel, I would like to interject that it was the clear feeling of the panel that these are not the result of individuals or lack of loyalty to the country or lack of dedication to the security of the Nation, but are inherent in the structure and the result of rapid change in weapons technology, and its effect in creating an obsolescence of the division of roles and missions between the land, sea, and air forces.

The first recommendation was that the military departments should be removed from the channel of operational command.

The second, that all the operational military forces of the United States should be organized into unified commands to perform missions which are called for by our strategic requirements.

The third, that the Chairman of the Joint Chiefs of Staff should be designated as the principal military adviser to the Secretary of Defense and the President.

The fourth, that the staff of the Joint Chiefs of Staff should be organized on a unified basis and placed under the control of the Chairman.

The fifth, that all officers above the rank of brigadier general or equivalent should receive their permanent promotions from the Department of Defense and would become officers of the Armed Forces of the United States.

Sixth, the line of operational command, and I stress operational command, should be from the President to the Secretary of Defense, to the functional commanders through the Chairman of the Joint Chiefs of Staff in his capacity as principal military adviser.

Next, that the line of logistic command should be from the President through the Secretary of Defense to the Secretaries of the three military departments.

Next, that the Secretary of Defense should be given direct authority over all research, development, and procurement, and he should have the right of cancellation and transfer of service programs, together with their appropriations.

He should also be given a direct appropriation for the conduct of research-and-development programs at the Defense Department level.

Then, going on, to the international scene, we recommend that we must strengthen the regional groups of nations not as an alternative to the United Nations but as a complement in line with article 51 of the charter.

Next, that the United States must make a concerted effort to meet the joint security requirements of all partners in the alliances in which we participate, by contributing to the development of a common strategic concept, by assisting in the reequipping of our allied forces, by fostering political cohesiveness, and economic and technical cooperation.

Next in relation to NATO, we must pool with our allies in NATO scientific and technical information, and provide them with nuclear weapons and delivery systems.

And next on civil defense. Civil defense must be part of our overall strategic concept. A program must be undertaken to include a warning system and fallout shelters.

Then ninth, we must face the fact that a meaningful reduction of armament must be preceded by a reduction in tensions and a settlement of outstanding issues that have divided the world since World War II.

At the same time concrete proposals to limit such a war as might be forced on us should be introduced into negotiations on reduction of forces.

Even if the Soviets should reject our proposals a unilateral declaration might give a strong incentive to follow suit.

And then, lastly, the expenditure area, starting immediately, defense expenditures must be increased substantially over the next few years. Testimony indicates that the current deficiencies in our strategic posture require additional expenditures each year of approximately 3 billion for the next several years.

This does not include necessary increased appropriations for mutual assistance and civil defense. Because we must maintain our present forces as we go into production of new weapons such as missiles, the cost of military programs will continue to rise until at least 1965.

Now, specifically, I would like to mention in the increased appropriations: Aircraft procurement to modernize existing units be authorized into the sixties while pressing for the most rapid development of operational intermediate range and intercontinental ballistic missiles.

Two, SAC base structure be made less vulnerable to surprise attack through dispersion and other protective measures.

Three, an accelerated research-and-development support be provided for such key programs as missiles.

Fourth, additional troop transport be authorized in the form of both modern aircraft and ships, and (5), the program of equipping both surface and underwater ships with missiles of various types be accelerated and additional funds for antisubmarine defense be provided; and, lastly, military pay scales be raised to retain skilled officers and men.

Those are the high spots, Mr. Weisl.

Mr. WEISL. Thank you, Mr. Rockefeller.

Before going into the specific recommendations which you make, I would like the record to show what your own experience has been in Government.

Would you please state for the record what positions you have held in Government?

Mr. ROCKEFELLER. The chairman was very generous in mentioning them.

I was first Coordinator of Inter-American Affairs in 1940. Then Assistant Secretary of State for Latin American Affairs in 1944. I was Chairman of the President's Advisory Committee on International Development in 1950, Chairman of the President's Committee on Government Organization, starting in 1953 and continuing to the present.

Under Secretary of Health, Education, and Welfare in 1953-54.

Special Assistant to the President for International Affairs in 1955.

Mr. WEISL. And you still continue as special assistant to the President, do you not?

Mr. ROCKEFELLER. No; that is not my title, Mr. Counsel.

It is chairman of his Advisory Committee on Government Organization.

It is a 3-man committee.

Senator JOHNSON. When did you resign as special assistant to the President or when did you cease to be President Eisenhower's special assistant?

Mr. ROCKEFELLER. Two years ago, 2 years and a week ago.

Senator JOHNSON. But you are still serving by his appointment as chairman of the Reorganization Committee?

Mr. ROCKEFELLER. That is correct, Mr. Chairman.

Senator JOHNSON. And how long does that term run, indefinitely?

Mr. ROCKEFELLER. Well, it is not a term appointment.

The committee has been in existence 5 years.

Senator JOHNSON. Thank you. Mr. Counsel.

Mr. WEISL. Mr. Rockefeller, you are undoubtedly familiar with the various attacks that have been made on the concept of your panel concerning vesting responsibility and authority in the Chairman of the Joint Chiefs of Staff.

You are familiar with the arguments that it puts the military above the civilian, that it vests extraordinary power in one man's hands, and that it will lead to Prussianizing the American Army.

That it will result in military domination of the United States, and so forth.

Would you care to comment on those criticisms?

Mr. ROCKEFELLER. I would be very happy to.

I would like to divide the discussion into 2 or 3 parts.

First I would like to say that this problem of the Joint Chiefs is not a new problem, and as weapons technology has moved forward since the last war, it has been increasingly recognized. But important statements about this problem were made right after the war, if I could give the background just for a minute by perhaps quoting.

I think one of the early statements was made by Secretary Forrestal in 1948.

Mr. WEISL. He was then Secretary of Defense?

Mr. ROCKEFELLER. Yes, he was, sir. He said:

The staff agencies established to assist the Secretary of Defense, the Joint Chiefs of Staff, Munitions Board, and Research and Development Board have the responsibility for formulating and establishing unified and integrated top guidance for the Department.

Yet these agencies are staffed at the policymaking level by representatives of those same three departments who spend a fraction of their time, effort, and thought on viewing the problem as a whole, and the major portion of their time conducting the affairs of their own departments.

This report cites the lack of communications between the Munitions Board, the JCS, and so forth.

Well, the Munitions Board and Research and Development Board were abolished in the Reorganization Plan of 1953.

The Chairman of the Joint Chiefs' position was strengthened by giving him an appointment authority over the Joint Staff.

Then I would like to quote from the Hoover Commission in 1949:

The individual chiefs of staff have allowed themselves to be influenced far too much by considerations of military particularism and aggrandizement and have failed sufficiently to recognize and accept their responsibility as an integrated agency of national military policy.

The underlying inherent weakness of the Joint Chiefs of Staff resides in the inability of the several members up to the present time effectively to cope with the service rivalries and service differences.

This is 1949:

The plans they—

the Joint Chiefs of Staff—

make in response to current international dangers or problems and in regard to the long-range future affect all the functions of government. Yet their accomplishments so far have been rather limited. Emergency plans relating to the current situation have recently been prepared but long-range planning is less satisfactory. It has been difficult to get the Joint Chiefs' clear advice and prompt decisions on numerous matters within their competence.

CATCHWORDS SIDETRACK SOLUTIONS

Senator JOHNSON. Mr. Rockefeller, Senator Saltonstall has a question.

Senator SALTONSTALL. Mr. Rockefeller, you mentioned the Hoover Commission of 1949?

Mr. ROCKEFELLER. Right, sir.

Senator SALTONSTALL. Did they recommend a single Chief of Staff? I did not think they did.

Mr. ROCKEFELLER. They did not, sir, but what I was trying to do was to develop this thinking on two sides.

One, is there a problem? If so, what is its nature?

Then, what are the solutions?

Now the difficulty, I think, in considering this problem in the past has been that every time anyone suggested solution to these recognized difficulties catchwords are thrown out immediately such as "the man on the white horse" or "the German General Staff" and that blocks, I think sometimes, intelligent effective thinking on the problem and what we might do about it.

The only reason I was reading those quotes, and I could read others but I don't need to, is to give the background that this is not a new problem. It is an accentuating one, and I think that sometimes the difficulty is that a solution is immediately attacked by these general catchwords, and therefore it is dropped, rather than: "what are we faced with as a nation," "what are its implications and causes," and "how can we take steps to meet it?"

And I don't think that making the Chairman of the Joint Chiefs the principal military adviser to the President and the Secretary of Defense is by any means the only solution to this question or that if it were done, it would not be necessary to make many other changes.

I think there is a composite series of changes that need to be made and that is a culmination in a sense of simplifying the structure in order to provide responsibility for decision and action at the highest level.

Senator JOHNSON. Senator Symington has a question for clarification he would like to submit.

Senator SYMINGTON. Mr. Rockefeller, when did Secretary Forrestal make that statement?

What was the occasion, do you know, so that we can identify it for the record?

Mr. ROCKEFELLER. The first report of the Secretary of Defense in 1948.

This was his first report as Secretary of Defense.

Senator SYMINGTON. When was it released?

Do you know the date of the report?

Mr. ROCKEFELLER. No, sir; I do not. It was 1948. I do not have the date.

Senator SYMINGTON. And the second quote came from the Hoover Commission?

Mr. ROCKEFELLER. The Hoover Commission, the Hoover Commission task force report, National Security Organization, appendix G-1949.

Senator SYMINGTON. Thank you.

Thank you, Mr. Chairman.

Mr. WEISL. Has General Bradley ever expressed himself on this subject, Mr. Rockefeller?

Mr. ROCKEFELLER. Yes, he has. He was on the reorganization committee in 1953, of which I had the honor of being chairman, but I have an earlier quote from him.

This is at the hearings before the House Committee on Armed Services, The National Defense Program, Unification and Strategy, 1949. Statement by General Bradley, Chairman of the Joint Chiefs:

Without disclosing the details of any vote in the Joint Chiefs of Staff, I may freely admit that on many occasions the Navy stands out alone in its concept of specific decisions. This is not because of any "old school tie" nor any collusion on the part of the Army and the Air Force.

The truth of the matter is that very few Navy men on the staff of the Chief of Naval Operations have had any experience in large-scale land operations. This may account for the fact that in joint planning their knowledge of the larger continental operations which we must ultimately face if we are ever to go to war with a land power is a must. Navy men frequently find their suggestions outvoted 2 to 1. This feeling may persist until more Navy men through the education available under unification have a broader understanding and perspective of war.

Despite protestations to the contrary, I believe that the Navy has opposed unification from the beginning, and that they have not in spirit as well as deed accepted it completely today.

As a policy question, but as a final and authoritative vehicle for planning our collective defense, no.

Mr. WEISL. Has ex-Secretary of War Robert Patterson expressed himself on this subject?

Mr. ROCKEFELLER. He did.

Mr. WEISL. What did he say?

Mr. ROCKEFELLER. I have a quote from him.

In Senate hearings, National Security Act Amendment of 1949, Secretary Patterson, former Secretary of War, made the following statement:

Since the war was over, a week after the surrender of Japan there was a request that the committee, "the Joint Chiefs of Staff", plan for the military defense of the United States. I know when I left the War Department 2 years later, the President had not yet received a plan.

The CHAIRMAN. They couldn't agree on it?

Mr. PATTERSON. They had a mass of memoranda but they couldn't agree on it. For 2 years, he didn't get that plan, and he should have had it in 2 weeks. That is what I mean when I say they are on dead center.

Mr. WEISL. Has any other general or military officer expressed himself on this subject?

Mr. ROCKEFELLER. Well, there are numerous ones. I might read a quote from Mr. Lovett, Secretary of Defense, in his letter to the President, November 18, 1952:

The statutory responsibilities of the Joint Chiefs of Staff indicate, in my opinion, one of the principal weaknesses of the present legislation. In brief, the weaknesses stem from (1) excessive rigid statutory prescription of functions, (2) rigid statutory composition which makes the agency in effect an interdepartmental committee, (3) the requirements of the statute that each agency perform functions inappropriate, if not actually impossible from an interdepartmental committee to perform effectively and efficiently.

By their very makeup it is extremely difficult for the Joint Chiefs of Staff to maintain a broad nonservice point of view. The maintenance of an impartial nonpartisan position becomes increasingly difficult in times of shortages of either men, money, or material. In fact, it is remarkable that the form of organization currently is being worked so well, and it is, I think, a tribute to the qualities of the individuals involved.

Mr. WEISL. Would you care to comment on the criticism that this will lead to military control of the United States?

Mr. ROCKEFELLER. I would be very glad to, because traditionally civilian control has been an objective and a goal which has been achieved by the Congress and the Executive. In the 1953 reorganization, that was a major objective.

In the deliberations of the panel, that objective stayed live and real, and in our opinion, as expressed in the text, we feel that that was achieved by the structure.

The Secretary of Defense is the principal assistant of the President in the execution of the military responsibilities of this Government,

and in our suggestion that the Chairman of the Joint Chiefs be the principal military adviser to the Secretary of Defense and the President, we did not give him extraordinary powers that are not held now by the Joint Chiefs as a group.

Mr. WEISL. In other, words, the Chairman of the Joint Chiefs under the plan of your panel would still be subject to the Secretary of Defense, still be subject to the President of the United States, his appropriations would still be subject to the Congress; and the Army, Navy, and Air Force would each have their civilian respective Secretaries, would they not?

Mr. ROCKEFELLER. That is correct.

Mr. WEISL. And the Secretary of Defense would also have his Assistant Secretaries who would be civilians, and the Secretary of Defense, under your plan, would have control of research and development.

Mr. ROCKEFELLER. That is correct, sir.

Mr. WEISL. Is there any other comment that you want to make on that criticism?

Mr. ROCKEFELLER. If I might, I would like to read briefly here from this analysis in the panel report of their feeling as to the reason for this problem, which is increasing in the Joint Chiefs.

Except for the Chairman, the members of the Joint Chiefs of Staff are the senior officers of the military services. Therefore, even with the best will in the world, they cannot avoid being advocates of a service point of view. The position of each reflects a lifetime of dedication to his service. He is primarily the product of its training school and its environment. Since he is responsible for the future of his service, its status and morale must be one of his chief concerns.

Thus, under the present organization, most of the decisive pressures on the Joint Chiefs of Staff organization are produced by the individual services, and the Joint Chiefs of Staff functions too often as a committee of partisan adversaries engaged in advancing service strategic plans and compromising service differences.

Too little in present arrangements permits the Chiefs of Staff time and opportunity to think spontaneously or comprehensively about overall strategic problems. The result is that our military plans for meeting foreseeable threats tend to be a patchwork of compromise between conflicting strategic concepts or simply the uncoordinated war plans of the several services.

Mr. WEISL. Mr. Rockefeller, we have received considerable evidence on the principle of the plan that you—that your panel recommended.

Many have favored the principle of it. Others have said that it should be done gradually.

Do you believe there is an urgent need to do it now?

NEED FOR CHANGE IS URGENT

Mr. ROCKEFELLER. I feel there is a tremendous urgency to do it now, Mr. Chairman, and in stating that I reflect the consensus of the 50 people on this panel.

In fact I can go further. The feeling of the panel is that if it is not done the other problems which are so urgent will not be met.

Mr. WEISL. In other words, it is the recommendation of this panel, as a cross-section of distinguished Americans from every walk of life, to do this now.

Mr. ROCKEFELLER. This is correct. But I think it would be a mistake to concentrate solely on making the Chairman of the Joint Chiefs the

principal military adviser to the President and the Secretary of Defense.

That is only 1 of 5 or 6 recommendations, all of which are designed to permit central conceptual thinking and strategic planning for the United States and the development of central direction and decisions in terms of the use of our service forces in the carrying out of strategic missions.

Mr. WEISL. Did your panel, after listening to witnesses, having the knowledge they have in military and civilian life, believe that today the United States has any overall plan of strategy?

Mr. ROCKEFELLER. No. Frankly the conclusion was that there are three national strategic plans, and that we do not have a single overall strategic plan of defense.

Mr. WEISL. As I understand it, Mr. Rockefeller, the purpose of the inquiry you so generously are financing and sponsoring is to recommend and to study an overall plan for the United States into which will fit the military posture, the economic posture, the foreign policy, the psychological policy, our relationship with our allies, our relationship to NATO, the sharing of secrets, the sharing of information with our allies, the strengthening of our alliances.

Mr. ROCKEFELLER. That is correct, sir.

The feeling of the group was that with the complexity of problems with which we are faced as a nation and with the rapid change in these, and the impact of one on the other that there could be useful thought and effort given to this problem of what are these questions we are faced with, how are they changing, how do they interrelate and what kind of a structure of conceptual thinking can we develop which will help the American people as a nation see these, not as specialized isolated questions, but as part of a whole which we have to face, and thus give us a clearer understanding of what the objectives in terms of national purpose and policies and programs to effectuate international purpose both at home and abroad, our national purpose both at home and abroad.

Mr. WEISL. If I correctly interpret what you so eloquently and so forcefully state in your report, your panel believes that the United States should, as quickly as possible, develop one overall policy, so that we are understood, so that we are militarily prepared, and prepared to make our campaign for peace.

Mr. ROCKEFELLER. I agree. But I would just modify the words you used, "one overall policy" to "a clear national purpose."

We will have many policies to implement a clear national purpose.

Mr. WEISL. That is a clear national purpose.

Mr. ROCKEFELLER. That has consistency and clarity and is really understood.

Mr. WEISL. In reaching conclusions as to the military posture of the United States, your panel, Mr. Rockefeller, recommended that we be prepared for three types of attack.

One is all-out war.

The other is the limited war and the third is the so-called nonovert aggression, aggression by subversion and by creating civil conflict and so forth.

Would you care to elaborate on that for the committee?

Mr. ROCKEFELLER. Well, I think the most dramatic obviously has been the all-out war and the one in which this country has concentrated and has developed such effective preparation.

However, with the development of Soviet atomic capability and with this tremendously rapid evolution in weapons technology, our group felt that there was increasing possibility that as the Soviet and ourselves reached equal capabilities of destruction there might—under the cover of our reluctance to use all-out force to oppose an action which did not seem warranted now knowing that such all-out action would bring major destruction in this country—that there might be a nibbling away at the periphery by small wars that we would not want to use all-out retaliation to oppose. Therefore we would have to be able to oppose small wars, if you could call them that, limited wars, in specific areas of the world, with decisive immediate and effective action and that that was something that we had not the present equipment or strategy to effectively handle.

That was one.

The second, I think, is clear. I think Syria is a good illustration of the kind of situation that has been developing where, through action that is not clear on the surface, problems are being raised in other parts of the world which ultimately can affect very seriously the overall security of the free world as a whole and our own security and we felt those needed to be more clearly understood and more clearly prepared for.

Mr. WEISL. I believe, Mr. Rockefeller, in your panel's report, you stated that until we had ballistic missiles in operation our principal defense or our principal deterrent against attack was SAC, and you pointed out, that SAC should be kept up to maximum strength through the 1960's.

Mr. ROCKEFELLER. It depends upon the speed with which missiles are developed to take the place of the SAC operation as presently constituted. But we estimated into the early sixties.

Mr. WEISL. But you did recommend that until we were sure of having ballistic missiles we should not let down one iota on the preparation and posture of SAC?

Mr. ROCKEFELLER. Exactly, and in addition that it should be strengthened and that its protection should be increased by dispersion and more effective warning systems.

Mr. WEISL. Your panel also, I believe, pointed out that as far as limited wars were concerned our military posture was not strong enough.

I think you pointed out that our weapons are not as modern as they should be, that they have not kept up with the technological improvement of weapons for limited war as the Russians have done.

And you felt that we should have more modern weapons, that research should be conducted to develop more modern weapons, that we should have a greater airlift and so forth, did you not?

Mr. ROCKEFELLER. That is correct, sir.

Mr. WEISL. How did your panel propose to deal with the question of subversion of other countries by Communist propaganda and incitement to civil war?

Mr. ROCKEFELLER. We felt that there was a clear case of where in the political field we must maintain close ties with the peoples

and the governments of those countries so as to help them avoid the possibility of that taking place.

The panel felt that the best defense against subversion was to prevent such situations from developing. This leads us into the subsequent subpanel reports on our international political relations, regional associations, and in the tremendously important programs of international cooperation in economic and social fields.

Mr. WEISL. In pointing out the need for improving our limited war capabilities, your report stated, and I quote:

The Soviet ground forces, already larger numerically than our own, are being reorganized and reequipped for atomic war. New rockets and missiles, capable of carrying nuclear warheads add to their atomic capability.

New tanks, artillery pieces, and light weapons give them a powerful conventional strength. Vehicles and communications equipment have been markedly improved.

In addition to these substantial forces in being the U. S. S. R. possesses a vast and readily mobilizable reserve.

Did you read the statement made by General Gavin as to the deterioration of our own Army equipment as far as waging limited war is concerned?

Mr. ROCKEFELLER. No, I did not.

I saw the headlines and the lead article but I did not read the text.

Mr. WEISL. But you do agree that we must at least equal or be better than the Soviet Army's equipment in order to successfully engage in limited war with the Soviet Union?

ARMY AIRLIFT SHOULD BE IMPROVED

Mr. ROCKEFELLER. Well, our group did not feel qualified to go into details as to how these objectives should be accomplished, but what we did feel was that there should be an acceptance of the conceptual idea of being able to fight effectively and decisively limited wars on a limited basis and that we should be prepared for that, and I think one of the problems was the question of airlift.

I can't remember whether it was in the final text or not but it was discussed by the group. The responsibility for airlift falls within the Air Force, but it would be Army troops, let's say, that would be carried by the airlift and they do not have the right to develop the planes necessary. The Air Force has other priorities under which they want to put the needed planes in other areas. So that was the case of where a needed program fell between stools.

Mr. WEISL. Mr. Rockefeller, your panel in illustrating the tremendous need for quickly developing antisubmarine warfare had this to say, and I quote:

The Soviet Union now has the second largest navy in the world, and since World War II has produced more vessels of every type, except aircraft carriers, than the United States. The Soviet Union has long concentrated on submarines.

A fleet of well over 400 is already in operation.

This number is greatly in excess of the German force which severely menaced Allied surface shipping during the early years of World War II.

There is no doubt about the capacity of the U. S. S. R. to develop naval atomic power plants, or to adapt ships and submarines to launch short and medium range missiles; in fact, Soviet leaders have pointedly discussed the vulnerability of the United States to such attacks.

The magnitude of the threat becomes clear when it is realized that 43 of our 50 largest cities and 85 percent of our industry are located within 500 miles of our coasts.

Missile launching submarines are the Soviet equivalent of our overseas air-bases.

That was the conclusion reached by your panel.

Mr. ROCKEFELLER. Correct.

Mr. WEISL. And in pointing out the need for keeping our SAC to its maximum strength your panel reached the following conclusion, and I quote:

Over the last 10 years the U. S. S. R. has not only maintained the largest number of planes in the world, but has progressively reequipped its air force with new and modern aircraft.

The Soviet Union now produces many aircraft at least as advanced as our own—and produces them in large numbers.

Moreover, the Soviets have demonstrated their ability to manufacture modern electronic equipment and to master the techniques required to guide and direct defensive and offensive aerial operations.

That was a conclusion reached after 1½ years of study.

Mr. ROCKEFELLER. Unanimously.

Mr. WEISL. Unanimously.

And to illustrate the urgency which your panel felt—I quote the following conclusion which your panel reached:

The Soviet weapons program has given high priority to the development of rockets and missiles. A medium-range ballistic missile capable of reaching Japan, Taiwan, and most of Western Europe from Communist bloc bases is already operational in limited quantities. Missiles of intercontinental range will soon follow.

That was a conclusion also reached, and is another illustration why you stress the urgency of the situation?

Mr. ROCKEFELLER. That is correct.

Mr. WEISL. The necessity of acting now.

Mr. ROCKEFELLER. That is correct.

Mr. WEISL. In your recommendations, Mr. Rockefeller, you pointed out that the Secretary of Defense should have control of research and development. Would you please elaborate on that for the committee?

Mr. ROCKEFELLER. Well, it is not a simple problem, as is obvious, and it was our feeling that research and development, particularly related to weapons and weapons application, should be continued in the service, but that we couldn't tell, with this rapid change in technology, how these things should be handled. It would be a mistake, we felt, to try and lay down any arbitrary decisions.

Therefore we felt the best thing to do was to give the Secretary of Defense the responsibility both for research, development, and procurement, give him the right to transfer funds, or to cancel them for different projects that were underway. We felt that he should have, in addition, funds with which he could undertake in the Department of Defense, at the Defense level, research, particularly longer range and forward-looking research on his own initiative; in other words, giving him complete flexibility to use the facilities of the Department and the three services to the maximum advantage of the country.

Mr. WEISL. And that could be controlled by the Secretary of Defense?

Mr. ROCKEFELLER. That is correct.

Mr. WEISL. Both as to budget and as to application?

Mr. ROCKEFELLER. That is correct.

Mr. WEISL. Of the developments of research?

Mr. ROCKEFELLER. That is correct.

Mr. WEISL. Your panel also made recommendations that we change our concept from having a separate Army, Navy, and Air Force, to a strategic task force concept. Would you please explain that briefly to the committee?

UNIFICATION PLAN REFLECTS EXPERIENCES

Mr. ROCKEFELLER. The committee felt that that was tremendously important and really reflected the actuality of what this country has done, for instance, in the last war and in the Korean war, where combined forces carried out specific missions under a combined command.

And, as you gentlemen know, there are various combined and unified commands now, and the Secretaries of one of the three services are made executive agents for the conduct of those, and on logistic matters the flow of responsibility comes from the President to the Secretary of Defense to the Secretary of the service on the logistic side, and that on strategic direction it comes from the Joint Chiefs of Staff to the Chief of Staff or Chief of Naval Operations of whatever service is the executive agent.

Therefore, it really is an outgrowth and an evolution of the pattern that has taken place, which is not clearly defined in the law establishing the Defense Department as such, but is permitted and has evolved.

This division of the operational functions concentrated in unified commands to carry out missions is a natural sequence of the actuality of the way things have been evolved, and the three services would continue to be the recruitment, training, and logistics arms of the Defense Department as the whole. They would supply the men and equipment and the units to the combined commands which would be established by the President to carry out whatever strategic missions were called for in our national defense.

Now, I think it is interesting that if one looks at either the organization of the Army or the Navy during the last war, one would find that that is very much the structure that both of those departments which conducted the war had. In other words, a division between the command functions and the training, recruitment, and logistic functions.

Mr. WEISL. In other words, you would apply modern technological development to the strategy of the defense of the United States, rather than stick to the traditional line of having one thing in the Army, one thing in the Navy, and one thing in the Air Force, regardless of whether conditions and weapons have changed?

Mr. ROCKEFELLER. We think it is essential that that be done. We can't fight effectively and defend ourselves effectively without it, and in actuality it is already in the evolutionary process by a patchwork method.

Senator SALTONSTALL. Would the counsel yield for a question on that?

Mr. WEISL. Yes, sir.

Senator SALTONSTALL. Mr. Rockefeller, are you saying in substance when you say that, that the direction of missions which is set out in the Unification Act, should be modified or abolished?

Mr. ROCKEFELLER. That is right, sir.

Mr. WEISL. At the risk of being repetitious, Mr. Rockefeller, but because the committee, from the evidence it has received, has been trying to do the very thing that your committee has been trying to do, namely, to call attention to the urgency of the situation, I would like to quote from another conclusion which your panel reached:

Ever since World War II, the United States has suffered from a tendency to underestimate the military technology of the U. S. S. R. When the Soviet Union produced its first long-range bomber, we comforted ourselves with the belief that it was simply a copy of our B-29. When it developed jet engines, some dismissed this achievement as due to the imitation of a British design. When our atomic monopoly was ended, we treated it more as a reflection on our security methods against espionage than as an indication that our technological lead was inherently transitory.

In the meantime, the Soviet Union has demonstrated that its achievements in the immediate postwar period were far from accidental. Today, Soviet science is at least equal to our own in many strategically significant categories. In the military field, the technological capability of the U. S. S. R. is increasing at a pace obviously faster than that of the United States. If not reversed, this trend alone will place the free world in dire jeopardy.

That was your conclusion?

Mr. ROCKEFELLER. It was, sir.

Mr. WEISL. Was it the conclusion of this distinguished panel that if the United States immediately applied the necessary means, it could win the race with Russia?

Mr. ROCKEFELLER. The committee had absolute confidence that that was the fact.

ECONOMY COULD STAND

Mr. WEISL. Now, in recommending an increase of \$3 billion, not including fallout shelters and survival insurance or passive defense, did you consult economists as to whether the economy of the United States could stand these expenditures?

Mr. ROCKEFELLER. We did, sir, and we have another subpanel on domestic, economic, and social objectives which has been studying the forward projection for the next 10 to 15 years and which worked on a cross-reference basis with this subpanel, and with the overall panel. And that is the confident judgment of the members of that panel. There will be a report, I hope in the next 3 or 4 weeks, from that subpanel on this whole subject of what our own capability is domestically to handle these questions, to handle them without the danger of inflation and to handle them at the same time as we deal with our domestic aspirations in terms of education, health, and growth.

Mr. WEISL. In other words, your panel found that we could increase our spending by \$3 billion each year, into the 1960's, without in any way imperiling the economy of the United States?

Mr. ROCKEFELLER. That is right.

There are a lot of things that are going to have to be done, but it can be done if there is a will and a decision to do it, sir.

Mr. WEISL. And you believe, as the chairman stated, that the best defense is the cheapest defense in the long run; do you not?

Mr. ROCKEFELLER. Oh, absolutely.

Mr. WEISL. Now, would you care to comment to the committee briefly on insurance or survival defense, the construction of shelters against fallout and against blast and the storing of food and medicine? And why your panel believes that that survival defense is necessary.

Mr. ROCKEFELLER. The panel felt, Mr. Counsel, after thorough discussion and review of this whole question, that civil defense or passive defense or shelters, or whatever term we want to use, is an important part of national defense. It felt that civil defense has not been related sufficiently to our strategic concepts of national defense, and that increasingly, as the capability of the Soviet to deliver a blow comparable to our retaliatory power we may well get to a point where the country which has the capacity to protect its civilian population so that it will continue with a will to resist has an important deterrent to attack. It could perhaps even preserve the peace. Therefore, in addition to the humanitarian aspect, there is a major military significance and a major force for peace in civil defense.

Mr. WEISL. I have one more question, as my time is up. I believe your panel found that if we did have shelters against fallout and against blast, that the casualties, if the unexpected should happen and an attack should take place, the casualties could be reduced by many millions of lives?

Mr. ROCKEFELLER. On a 50-city attack, sir, the estimate was total casualties of 65 million, and that a reduction of 25 to 35 million casualties could be accomplished possibly by this approach.

Mr. WEISL. My time is up, Mr. Rockefeller, and I am very grateful to you for your testimony.

Mr. ROCKEFELLER. Thank you, sir.

Senator JOHNSON. Mr. Rockefeller, under the rules of procedure of our committee, counsel examines the witness for 30 minutes, or attempts to keep his original examination within 30 minutes, and each Senator attempts to keep his original examination within 10 minutes. We hope that you will be as responsive as you can, and still be brief in your replies to our questions.

Mr. ROCKEFELLER. I will keep that in mind, Senator.

Senator JOHNSON. The Chair has just been handed an announcement which I think will please all members of the committee and all of us as Americans. I want to read that announcement:

The Department of Defense has just announced that the Atlas intercontinental ballistic missile was again launched successfully at the Air Force Missile Test Center at Cape Canaveral, Fla., at 10:49. This was the second successful test launching of the Atlas.

The Chair would like to point out that these tests are not flight tests of a fully operational missile, but tests only of certain components.

Even so, they are quite encouraging. Again as members of the committee we should bear in mind the testimony of the many witnesses

before us that our production of such missiles can be and should be, and the Chair thinks must be, accelerated, and that the moneys for such purpose should be restored. In the Chair's opinion, additional funds must be provided and redtape cut as quickly as possible.

Now, Mr. Rockefeller, when was your study group formed?

Mr. ROCKEFELLER. It was formed a year and a quarter ago, in 1956, in the fall.

Senator JOHNSON. Did you then consider it necessary or merely desirable to set up a group to study international security?

Mr. ROCKEFELLER. Well, I think it is fair to say that the group felt that the whole study was necessary and important and could be very useful and, we hoped, helpful.

Senator JOHNSON. So you felt it was necessary.

Why did you feel it was necessary for a private group to make a study of the Nation's security?

Mr. ROCKEFELLER. Well, we felt that in a democracy the citizens not only could but should exercise responsibility of studying and trying to analyze and, to the extent possible, contribute to the thinking of the Nation so that the people of the country would have at least that group's opinion on the important issues to possibly help them in considering their action.

Senator JOHNSON. You felt an informed citizenry would be an aroused citizenry and that an outside group could make a contribution to firing up the people with the sense of urgency which you felt was needed?

Mr. ROCKEFELLER. We felt a deep concern and we wanted to share it.

Senator JOHNSON. Now, in preparing your report and formulating your conclusions and recommendations, did you have access to all Government information that you felt was necessary?

Mr. ROCKEFELLER. We did, sir.

Senator JOHNSON. Nothing was withheld from you?

Mr. ROCKEFELLER. Nothing that we asked for. But may I say, Mr. Chairman, there, if you will permit me, our purpose in selecting the subpanel members was to get a group of men together who had been in the Government in these various areas, who were still working with various phases of our national defense problem, and to rely on their collective judgment and consensus rather than trying to go out individually to get specific information in the form of intelligence and then interpret it ourselves.

We relied on their informed judgment.

Senator JOHNSON. Well, so far as you are aware, there was no coverup and no desire on the part of the Government to refuse you any information that you felt was necessary?

Mr. ROCKEFELLER. That was correct, sir.

Senator JOHNSON. Have you read the Gaither report?

Mr. ROCKEFELLER. No, I have not, sir.

Senator JOHNSON. Have you been briefed on it?

Mr. ROCKEFELLER. I have, sir, but not in my capacity of chairman of this committee but in my Government capacity.

Senator JOHNSON. Would you care to give the committee a succinct statement of your opinion about it?

Mr. ROCKEFELLER. I don't think I am under that position, sir, because I was given that information in my work for the President, and as a staff officer I am not at liberty to discuss that report.

DECISION ON AVAILABILITY OF GAITHER REPORT AWAITED

Senator JOHNSON. We are continuing our efforts to continue to secure that information. We think it is very important for a committee of Congress, with the responsibility that we have, to have made available to us all the information that we can obtain before we reach our conclusions and make our recommendations.

I should like to report to the committee that I had two additional conversations with representatives of the President. Although no decision has been made, I have been encouraged to believe that perhaps the early part of next week we may have a decision in connection with making that information available to us.

This concerns me very much, Mr. Rockefeller, and I want to get your opinion on it.

Mr. ROCKEFELLER. The question of the Gaither information?

Senator JOHNSON. No.

Mr. ROCKEFELLER. I beg your pardon.

Senator JOHNSON. We have heard some of the outstanding military experts of our time testify before this committee in the last few days. We have heard a great paratrooper, General Gavin, who is leaving the Army because he feels that he cannot in good conscience continue to support the policy of the service.

We have heard from General White, the Chief of Staff, the top military man in the Air Force, the day before yesterday. We have heard from General Schriever, who has great responsibilities in connection with the missile program. All of this testimony adds up to one thing: that their recommendations for funds had not been granted.

I don't think I breach security when I say that in the case of missiles the difference between the requested amount and the approved amount was 42 percent.

Now, 3 months after sputnik, we are saying to our top missileman, "We are going to reduce the amount of funds that you think are essential by 42 percent."

Now my question is, in your study were you able to determine why so little attention was paid to the requests of our top experts so far as providing funds is concerned?

Mr. ROCKEFELLER. Well, I think the point you raise is excellent because it seems to me that it illustrates this anachronism we are faced with in the three services with the roles and missions which really do not apply to the technological problems of our defense today, and therefore, you have three services trying to develop weapons for their own concept of their roles and missions in terms of modern technology which may be in major conflict with each other, and at the same time trying to reconcile those at the level of the Joint Chiefs. A request from one service may be completely out of line with the agreed concept of the three services which may in itself be a compromise.

Consequently, I think they are the victims of the system as it works out today and I don't think one can draw a conclusion that because

one chief of a missile program in one service was denied 40 percent of his requested appropriation that that necessarily means that the Defense Department as a whole was delinquent in the concept of the conduct of missile programs.

Senator JOHNSON. I have not charged anybody with delinquency yet. I do want to point out though that we still are relying on the Strategic Air Force to defend this country.

I further want to point out that the head of the Air Force says he needs hundreds of millions of dollars for bombers and tankers and for support that he cannot get and that he has not gotten after he has appealed to every proper authority.

I want to point out that the Army's expert is on his way out, because he says he cannot get the funds.

I want to point out that the Air Force request for missiles has been reduced 42 percent.

Now we have not had the Navy in executive session yet. We will pursue that further, but it seems if the Army, if the Air Force, if the Navy, if all the people that have anything to do with satellites or missiles or anything else find that their recommendations, based on their best judgment, have been cut in half, it might be that you have suggested to the committee the proper word that we could use "delinquent."

Now, my question to you is this: In your study, were you able to determine why so little attention was paid to these requests?

For instance, I want you to elaborate on what are the specifics that limit our response to the Soviet challenge. Is it money? Is it men?

I observe that you have made a recommendation that we spend considerably more money. Can you tell the committee briefly why you think so little attention has been paid, not to what has been said by a private group, but what has been said from the inside, from the men that we must rely on?

Mr. ROCKEFELLER. Mr. Chairman, our conclusion was that there were these factors involved. That there had been a general complacency during the past dozen years. There had been an underestimate of Soviet technological development, weapons development; that there was not a sufficient amount of money being spent to meet the problem with which we were faced and that it should be importantly increased, but that in order to insure the most intelligent application of additional funds, these changes in organization had to be made in order that judgmental factors could best be given within the Defense Department as to how it could be most intelligently and economically spent for our security.

Senator JOHNSON. All right, I do not want to belabor that point. Let me ask you this question.

You have made your recommendations, you have put them on the record, and history will note them. But at this time if you had to make your choice between following general complacency and following General White, which one would you choose?

Mr. ROCKEFELLER. Well, I did not have the privilege of hearing General White testify, if what you are referring to has relation to his suggestions, but I have great admiration for him.

Senator JOHNSON. I will repeat them. General White says he needs hundreds of millions of dollars more for bombers and tankers. He has given that as his testimony.

Mr. ROCKEFELLER. I think we agree with him.

Senator JOHNSON. Thank you.

Now, let us assume a maximum effort on our part. How long do you think it will take us to catch up and surpass the Russians?

Mr. ROCKEFELLER. Well, Mr. Chairman, our group was not optimistic that that was something which could be achieved in a short period of time, and that an effort, a sustained major effort, for 10 years at least was going to be essential.

Senator JOHNSON. And what do you mean by sustained effort—a major effort?

Mr. ROCKEFELLER. Increased appropriations and expenditures to meet whatever developments might appear on the horizon.

THE IMPORTANCE OF OUTER SPACE

Senator JOHNSON. Would you give the committee a brief statement about your views on the importance of outer space, not just militarily, but to the building of a better and more peaceful world?

Mr. ROCKEFELLER. Well, I think the first and clear impact that hit us all was the forceful psychological impact on the people of the world of the launching of the Soviet sputnik. It opened up in terms of a mental awareness on the part of people generally that we were living in a world where outer space was becoming a factor and a major factor.

Senator JOHNSON. It is your opinion, then, that the Russians have placed a higher valuation on the importance of outer space than perhaps we have?

Mr. ROCKEFELLER. I think a higher priority of effort, Mr. Chairman.

Senator JOHNSON. Do you feel that up to recent months we have failed fully to utilize our scientific and technological potential in developing space weapons and facilities?

Mr. ROCKEFELLER. Well, it was the feeling of our group that we ought to intensify in all areas the scientific effort in terms of training, research, basic research, development of specific items within the research area, and the whole weapons technological development in the field.

Senator JOHNSON. Do you believe that steps are being taken now in the Government to carry out the recommendations made in your report?

Mr. ROCKEFELLER. Well, Mr. Chairman, I must say that all those members of the panel with whom I have had the opportunity of talking since your statement of a couple of days ago, and since the President's statement yesterday, are tremendously encouraged and tremendously enthused by the attitude that you expressed and that he expressed on these problems.

Senator JOHNSON. Counsel suggested this question: Was Dr. Kilian a member of your panel?

Mr. ROCKEFELLER. He was up until the time he became Special As-

sistant to the President, sir. He was chairman of one of the subcommittees.

Senator JOHNSON. Have you been following the developments in this committee since we started our original hearings with Dr. Teller?

Mr. ROCKEFELLER. I followed them in the press, sir, but I haven't read the testimony in any detail.

Senator JOHNSON. Do you have any suggestions that you care to make to this committee as to how we can increase our contribution to this total effort?

We appreciate very much the study you have made and the money and time you have given, and the patriotism you have displayed, and we should be glad to have you tell us anything additional that you would like to, or to make any suggestions to us that you think would be helpful.

PANEL IMPRESSED WITH COMMITTEE

Mr. ROCKEFELLER. I think all of us on the panel have been tremendously impressed with the way this committee has gone about its business—the impartial searching for the basic problems and the facts which face this country. We feel that your objectives and ours have been the same in trying to find out what our Nation is going to be faced with in the way of problems in the future, and what steps are essential immediately to put us in a position where we can effectively meet these problems and these challenges to insure our survival, and the opportunity to meet the broader humanitarian problems which are the objective in the framework of peace for all of our people.

Senator JOHNSON. In effect, what your report says is we are not doing enough, we must do more, and unless we do, it is going to be a pretty dreary world. Is that right?

Mr. ROCKEFELLER. And we might not be in it, either.

Senator JOHNSON. Thank you. Senator SALTONSTALL.

Senator SALTONSTALL. Thank you, Mr. Chairman.

Mr. Rockefeller, it is good to have you here at the other side of the table again.

Mr. ROCKEFELLER. Thank you very much, Senator.

Senator SALTONSTALL. I have read your report and I have listened to what you have said this morning. One fundamental thing, it seems to me, we have got to face in working out these problems regarding our defense and our security, is that we want to make improvements in our methods of defense and in building up our security, but we do not want to do it by weakening our present strength. In other words, we cannot go ahead too fast in any one reorganization plan that might disorganize things and weaken our present strength. Is that not right?

Mr. ROCKEFELLER. I would have a question as to whether speed would be the factor which would undermine the present structure. I certainly agree with you that nothing should be done that will undermine this present strength. I am not sure whether speed of reorganization is necessarily an element of the deepest concern.

Senator SALTONSTALL. Or the extent of the organization; that is what I had in mind more.

Mr. ROCKEFELLER. The character of the organization.

OVERHAULING OF LAW SHOULD BE CONSIDERED

Senator SALTONSTALL. Yes. Now, you emphasized, and I think quite correctly, that the single chief of staff was not the only method of reorganization. You enlarged in your report on the planning, the overall planning and the question of missions and whether the missions should be changed.

As you know, in 1947 when the Unification Act was adopted, it was adopted with a great deal of difficulty after many compromises. And one of the compromises was that the missions should be set out in legislation. There is an opportunity now for a further consideration of those missions and perhaps an elimination of them in a legislative way if the technology requires.

Do you agree with that?

Mr. ROCKEFELLER. Yes, I do, sir. I think it is essential.

Senator SALTONSTALL. Now, on planning, the military now have a present plan, a plan for 4 or 5 years ahead, and then a long-range plan; do they not?

Mr. ROCKEFELLER. The services certainly do. I am not clear as to whether the military as a whole has a national plan of the character you describe.

Senator SALTONSTALL. What we should have under your concept is a national plan now and a national plan looking to the future beyond our present possibilities and needs?

Mr. ROCKEFELLER. Exactly.

Senator SALTONSTALL. Under the Secretary of Defense, there should be an opportunity for an overall planning rather than in a partial way as it is done now?

Mr. ROCKEFELLER. That is correct, sir. To develop three separate plans based on roles and missions which our committee did not feel related to modern weapons technology or the problems we are faced with in the nature of defense and then try to merge them was a virtually impossible task.

Senator SALTONSTALL. Again going back to the Unification Act, one of the compromises was not to give the Secretary of Defense too large a staff, not to give the Joint Chiefs of Staff too large a staff, but to keep those in the various services. What you are saying, in substance, is that that theory or that principle should now be changed so as to concentrate those more in the Secretary of Defense?

Mr. ROCKEFELLER. That is correct, sir.

Senator SALTONSTALL. Now, in the same way, should not the Secretary of Defense in your opinion be given more discretionary funds? There is a tendency to cut down his discretionary funds in the military budget. It has always seemed to me that he should have a larger discretionary fund which he can work it where it is most needed.

Mr. ROCKEFELLER. We feel very strongly on that, sir.

Senator SALTONSTALL. And you also agree that he should have a larger military staff?

Mr. ROCKEFELLER. Yes, sir.

Senator SALTONSTALL. Which should be a planning staff?

Mr. ROCKEFELLER. Correct.

Senator SALTONSTALL. Now, you went into civil defense as a part of the insurance, so to speak, of the future, with the counsel. One of

the questions before us for years has been whether the civil defense should be placed in the Department of Defense.

Mr. ROCKEFELLER. We did not consider that recommendation or we did not make that recommendation, and our feeling was that civil defense questions should be part of military strategic planning. How they were executed, we did not go into.

Senator SALTONSTALL. If it becomes a part of the overall strategic planning, presumably either the head of the civilian defense has got to be under the Secretary of Defense or else he has got to be awfully closely coordinated with the Department of Defense.

Mr. ROCKEFELLER. Yes. I think our feeling was the latter.

CIVIL DEFENSE FUND INCREASE ADDITIONAL

Senator SALTONSTALL. You state that your suggestions and recommendations as to the overall needs, would require an additional \$3 billion in the budget for at least 10 years to come, is that not correct?

Mr. ROCKEFELLER. An additional \$3 billion each year.

Senator SALTONSTALL. Each year, yes, that is what I meant. Now, that does not include civil defense?

Mr. ROCKEFELLER. It does not, sir.

Senator SALTONSTALL. So that that expenditure, depending on how far we go, would be entirely in addition to what you suggest?

Mr. ROCKEFELLER. Correct.

Senator SALTONSTALL. You also have gone into considerable discussion, and quite rightly, on the space problem. Do you believe and did you give consideration to the fact as to whether the problem of research of space should be put in the Department of Defense or be considered as a separate subject entirely outside of defense?

Mr. ROCKEFELLER. Well, it was our opinion that that decision should be made by the Secretary of Defense or he should have the authority to make it and set it up as he saw fit, depending on conditions.

Senator SALTONSTALL. But it should be in and a part of the defense effort and not an effort entirely outside of defense, or to include defense but be outside of the defense effort?

Mr. ROCKEFELLER. We did not make a recommendation that it should be outside the defense effort.

Senator SALTONSTALL. So that if it is set up as a separate research effort, as a separate development effort, it should be under the Secretary of Defense, in your opinion?

Mr. ROCKEFELLER. We feel it should be his decision as to where it should be established.

Senator SALTONSTALL. Mr. Rockefeller, I think the only other question I have at this time is this: You end up, as did the President yesterday, on never relaxing our efforts for peace. While building up our Defense Department, reorganizing it, streamlining it so that we can make decisions quickly and get actions on those decisions, our every action and all our decisions must at the same time be directed toward greater effort in getting world peace.

Mr. ROCKEFELLER. Absolutely.

Senator SALTONSTALL. And we should spend what funds are necessary to achieve that end as well as to build up our defense effort. You thoroughly agree with that?

Mr. ROCKEFELLER. Completely: that the defense effort gives us the time and the opportunity to accomplish the other, which is the basic objective.

Senator SALTONSTALL. But that is a mighty important thing, too.

Mr. ROCKEFELLER. Absolutely, sir.

Senator SALTONSTALL. Thank you, Mr. Chairman.

Senator JOHNSON. Thank you, Senator Saltonstall.

Senator KEFAUVER.

Senator KEFAUVER. Thank you, Mr. Chairman.

Mr. Rockefeller, before asking you any questions, I want to join in saying that I am glad that there are people like you around who use their means and their organizational capacity to study and find out things and make recommendations for the benefit of our country such as are contained in this study and in the recommendations made by you and the panel with which you work.

Mr. ROCKEFELLER. You are very generous, sir. It was the Rockefeller Brothers Fund.

Senator KEFAUVER. Mr. Rockefeller, in reading your report or the report of the group, I was not exactly clear as to just what would happen and what the responsibility of the remaining members of the Joint Chiefs of Staff would be under your recommendation. Your recommendation is that the Chairman of the Joint Chiefs be the principal military adviser to the Secretary of Defense. Then you recommend that the operational command would be from the President and the Secretary of Defense to the functional commanders through the Chairman of the Joint Chiefs in his capacity as principal military adviser, and then later that the chiefs of the several services would continue to serve on the Joint Chiefs of Staff, but only as advisers to the Chairman in the areas of logistics, training and procurement.

Then the line of logistic command would be from the President through the Secretary of Defense to the Secretaries of the three military departments. It is not clear to me whether the remaining Joint Chiefs of Staff would continue to be the head of their services or just exactly what they would do.

Mr. ROCKEFELLER. In their capacity as members of the Joint Chiefs of Staff, they would be an advisory body to the Chairman. In their capacity as chiefs of their service, they would be responsible for the carrying out of recruitment, training and logistics.

Senator KEFAUVER. But not operational commanders?

Mr. ROCKEFELLER. Not operational commanders. But they would reflect with the Chairman of the Joint Chiefs the important elements of research and development, procurement, manpower and so forth as conducted by their respective services.

Senator KEFAUVER. Now, the operational command would be performed by the President through the Secretary of Defense, I mean through the Chairman of the Joint Chiefs. But at that point the other Joint Chiefs would not have any responsibility?

Mr. ROCKEFELLER. They would not, except in an advisory capacity.

Senator KEFAUVER. Then, sir, does this contemplate that you would have only three members of the Joint Chiefs of Staff, or would there be an additional amount plus the Chairman?

Mr. ROCKEFELLER. The Commandant of the Marine Corps is a member of the Joint Chiefs, and he operates when matters of concern to his corps are involved and we made no suggested change in that.

Senator KEFAUVER. That is correct. But what I mean is, suppose the head of the Army were made the chairman, just for example, of the Joint Chiefs. Would your plan then call for another person from the Army to be a member of the Joint Chiefs to be the adviser on logistics, training, and procurement?

Mr. ROCKEFELLER. That is correct, sir.

Senator KEFAUVER. You mean then the number of Joint Chiefs would be increased by one so as to make available the Chairman as the principal military adviser to the Secretary of Defense?

Mr. ROCKEFELLER. The number would be the same as under the present system.

Senator KEFAUVER. I did not think that was made quite clear in your—

Mr. ROCKEFELLER. It was not, and I appreciate your bringing it out.

Senator KEFAUVER. Then as I see this, the other chiefs would have responsibility in the areas of logistics, training, and procurement, and would be advisers in connection with the operational command, but would not have the direct responsibility.

Mr. ROCKEFELLER. That is correct.

Senator KEFAUVER. Is it your thinking in that connection that this would enable them to think and act from a more unified basis than they do at the present time, that is, for the good of the overall service?

Mr. ROCKEFELLER. Their responsibility would not be in the development of strategic plans. The development of strategic plans is where the function of a service is important, in effect, what its role and mission will be in any specific area that is under consideration. As their voice would not be active in that function, there would not be the confusion nor the competitive situation that now exists where naturally per force strategic plans are represented by their service.

Senator KEFAUVER. So as I see it, Mr. Rockefeller, your report strikes a compromise between those who do not want to have a one-man Chief of Staff and those who would want to continue on the present arrangement.

Mr. ROCKEFELLER. That is absolutely correct.

Senator KEFAUVER. And when it comes to the operation of the services, you would have one man with them acting as advisers, but when it comes to logistics, training, and procurement, they maintain their present responsibility.

Mr. ROCKEFELLER. Correct, sir.

Senator KEFAUVER. Let me make it clear again that you recommend that when the chairman is taken from one of the services then there would be an additional person to represent that service in connection with the logistics, training, and procurement policy on the Joint Chiefs of Staff?

Mr. ROCKEFELLER. That is correct, sir.

Senator KEFAUVER. Then, finally, Mr. Rockefeller, it is evident of course that you and the members of the various panels must have gotten a lot of information, a tremendous amount of study, the advice of many people, in arriving at these conclusions, which are, of course, reflected in the report?

There would be a tremendous source of information which could be used in addition to the printed document, your report.

Are the President and the National Security Council, the heads of the services and others considering these matters, are they making use of the information, the data that have been collected by members of your panel; that is, is there coordination?

Are they using to the fullest extent facts that have been gathered?

Mr. ROCKEFELLER. Well, this was entirely a private effort, Senator Kefauver, and—

Senator KEFAUVER. Well, private or official, it has been done by great men and thoughtful men and it should be fully used.

The President in his state of the Union message indicated that there would be some recommendation for the reorganization of the Defense Establishment, and I just wonder if the facts and information gathered by your group will be used to the fullest extent?

Mr. ROCKEFELLER. I think, frankly, Senator Kefauver, that the conclusions are more valuable because they represent the collective thinking and agreement of experienced men, than, shall we say, the raw material or the specific material that lies back of them?

Senator KEFAUVER. I am sure that is true, but also the specific material back of them would also be valuable to us.

In any event, the men who collected the material do not feel that their job is over just by writing a report. They are available for such consultation and information as the President or our military people or Members of Congress, or committees of Congress may wish.

Mr. ROCKEFELLER. That is correct, sir.

Senator KEFAUVER. Thank you very much, sir.

Mr. ROCKEFELLER. Thank you.

MUST STEP UP PACE

Senator JOHNSON. Thank you, Senator Kefauver.

Mr. Rockefeller, is it fair to say that you think that we ought to be spending more on bombers, more on missiles, that we ought to be not only spending more but doing more now?

Mr. ROCKEFELLER. That is the conclusion reached and expressed in the report, sir.

Senator JOHNSON. Senator Flanders?

Senator FLANDERS. Mr. Rockefeller, I want to join in the commendation of the undertaking which you and your brothers have started. It is exceedingly valuable to have a competent analysis made and publicly produced and expressed and subject to public discussion and understanding. I don't know of a more valuable thing you could have done in connection with defense.

Mr. ROCKEFELLER. Thank you, sir.

Senator FLANDERS. Now I have a number of questions and I will try to make them simple.

I want to refer to your section 10 as reported in the New York Times, "Tensions and Reductions of Armament."

Of course, we are concerned in this committee, Mr. Chairman, particularly with armament, but disarmament and armament are so closely connected that I am going to put a question or two with regard to armament, particularly since you have included it in your report.

Now, you say :

A reduction of armaments is not meaningful unless it contains safeguards against violations of the agreement. But effective control has been complicated by the increasing rapid advance of technology.

Is there not, however, a correspondingly rapid advance in the technology of gaining information? I refer to such things as the revelation by the Aviation magazine of that radar equipment in Turkey—which seems to me was rather astonishing to those of us who did not know of its capabilities. And I have some reason to think, not to know, that there are similar tremendous advantages in getting information going on at the present time.

So I would like to see a little balance in your report at that point. That leads up to this question: Suppose we approach the disarmament problem in this way: First, say to ourselves and to the world that there is no mutual confidence. That is a fact too often ignored in the discussion.

And then say there will be no unilateral disarmament on our part but there will, on the contrary, be a unilateral increase in strength on our part. These are the basics. And that we will agree to nothing without inspection and control.

Now, with those bases established, is there not still an area of mutual self-interest on which we can approach the Soviet Government?

Mr. ROCKEFELLER. Well——

Senator FLANDERS. Quite away from mutual confidence, an area of mutual self-interest.

Mr. ROCKEFELLER. Well, I think you develop the thing, Senator, in a most interesting way, a little differently than the committee did. But it seems to me it is a real contribution in the thinking on this subject.

Senator FLANDERS. I am just making that suggestion as one for consideration because it has seemed to me to be a neglected approach.

Mr. ROCKEFELLER. I think you are right.

Senator FLANDERS. And we certainly at the present moment have struck a roadblock. Here is a suggested detour.

Mr. ROCKEFELLER. The mutual interest in survival.

Senator FLANDERS. Yes; that is the interest on both sides of the Iron Curtain.

Now, one other question: I note that in all discussions of armament and disarmament there is one element of offense of which little or nothing is said. I wonder if there was any tacit position taken by your group on the subject of biological warfare?

Mr. ROCKEFELLER. Well—

Senator FLANDERS. Maybe I should not ask that question out loud.

Mr. ROCKEFELLER. No; I think it was touched in the shelter program, the fallout shelter program, that there should be shelters against various biological and chemical warfare possibilities, but only in that reference.

Senator FLANDERS. There are serious problems connected with it. Would you feel that the possibilities were so serious that the chances were that neither side would resort to biological warfare?

WOULD PREPARE FOR BIOLOGICAL WARFARE

Mr. ROCKEFELLER. Well, frankly, I do not suppose we can definitely conclude anything, that we can't eliminate any chance as a possibility. As past history would certainly indicate what you say is correct.

Senator FLANDERS. You would be prepared for biological warfare without question?

Mr. ROCKEFELLER. That is correct.

Senator FLANDERS. That is all, Mr. Chairman.

Senator JOHNSON. Thank you very much, Senator Flanders. The committee will take a 5-minute recess.

(Short recess.)

Senator JOHNSON. The committee will come to order.

Before resuming with Mr. Rockefeller's testimony, I should like to announce to the committee that it is our plan to have sessions each morning and afternoon each day next week. We are very anxious to conclude with the witnesses that we have already asked to come here.

In addition, we have requests for other witnesses. As an example, Senator Symington has suggested that we request General Bradley, General Spaatz, and Admiral Nimitz to testify. I am extremely reluctant to add a large number of witnesses to our already large list, for fear that before we conclude with our witness, the problem we are attempting to solve may be beyond us.

On the other hand, there is no living American that has been more alert to our preparedness needs, more vociferous and more persuasive and with a better background than the former Assistant Secretary of War, the first Secretary of the Air Force, the Chairman of the National Security Resources Board, and the chairman of a subcommittee of the Armed Services Committee that made a thorough study in 1956 of this very matter. I must assume that men of General Bradley, General Spaatz, and Admiral Nimitz' capabilities could give this committee considerable food for thought in connection with the problems that face us.

After talking to the ranking minority member present, it is my opinion that in view of the experience Senator Symington has had, the feeling he entertains and the capabilities of the witnesses suggested, we ought to add these men to the list. I am going to comply with this request and I am going to ask not only him, but any other member of this committee who has any suggestions, to make their suggestions to the chairman. Senator Symington, Senator Saltonstall and others have made specific suggestions to me almost daily, and all of them have been most constructive and very helpful. We want to cover this inquiry thoroughly, but not take so long doing it that our work will be of no value.

Senator Saltonstall suggests that perhaps if we call these three men, we ought to ask General Marshall. I think that would be appropriate.

So, without objection, the Chair will ask the counsel to notify these four men that we would like to hear any testimony from them that they are prepared to give before this committee, and to arrange for times to suit their convenience.

Senator CASE. Mr. Chairman.

Senator JOHNSON. Senator Case.

Senator CASE. If you are going to call those, I would like to suggest that you also call Gen. Ira C. Eaker, who was in charge of the missile program during the time that General Spaatz, I believe, was Chief of the Air Force.

Senator JOHNSON. The Chair will give thought to that suggestion, talk to the Senator from South Dakota about it, get his reasons for it, and see if that can be worked out. I would not want to include him in the list at this time until we have explored it a little fuller.

Senator CASE. I thought I was merely responding to the chairman's invitation for members of the committee to make such suggestions.

Senator JOHNSON. The chairman is not criticizing the Senator for responding but is just saying he will talk to the Senator about it and discuss the request further with the Senator.

Senator SYMINGTON. Mr. Chairman.

Senator JOHNSON. Senator Symington.

Senator SYMINGTON. I know the distinguished Senator from South Dakota would like the record to be straight. General Eaker was not assistant to General Spaatz when General Spaatz was Chief of Staff of the Air Force. General Eaker left the Air Force in the summer of 1947 when it was still the Army Air Corps.

Senator CASE. That is correct. He presented testimony.

Senator SYMINGTON. I just want to state that for the record. General Eaker is now in Washington and a member of the Douglas organization. I believe Mr. Douglas is going to testify.

Mr. Chairman, the reason I suggested those three was that they were the men who operated the Department of Defense right after the end of the war, and at the same time were fairly closely involved with the Woodrum committee which was the first serious effort, to the best of my knowledge, to straighten out the problem of duplication and waste in the Pentagon Building.

I want to express my very deep appreciation for what the chairman has just said, and I say that nobody in the Congress has been

more consistent in attempting to obtain adequate defense than he has. I am grateful for his remarks.

The chief reason I would like to see these gentlemen called is because of the matter Mr. Rockefeller has so ably presented this morning with respect to the importance of reorganizing the Defense Department. I believe the President yesterday said we had spent \$225 billion since the Korean war on our national defense.

In my opinion, based on my 5 years in the Pentagon, and previous and subsequent connection with our defense, at least \$50 billion of that, if not closer to \$75 billion, is waste because of the organization of the Pentagon today.

I thank the Chair.

Senator JOHNSON. If Senator Stennis, who is always kind, patient, and understanding, will indulge me for a moment, I would like to list the witnesses for next week. I will ask the counsel to consult with General Marshall, General Bradley, General Spaatz, and Admiral Nimitz and see if it will suit their convenience to testify and, if so, when.

In addition, we will lead off Monday with Gen. David Sarnoff. We will then have Admirals Burke, Weakley, Clark, and Raborn. Then Secretary Norton and Admiral Heyward, Mr. Bunker of Martin and Mr. Kelly of the Bell Laboratories and General Twining in closed session, Mr. Douglas of the Douglas organization, Mr. Kimball of Aerojet, Mr. Collins of Northrop, Mr. Gross of Lockheed, and Mr. Lanphier of Convair, Mr. Kindelberger of North American, Mr. Huley of Curtiss-Wright, and Mr. Allen of Boeing.

I want to express my appreciation to the committee members for keeping their questions to a minimum and within limits and also for their not interrupting counsel. I was fearful yesterday that the counsel could not make his record as straight as he wanted to because of our frequent interruptions. I am perhaps the worst offender. But I thank all of you for cooperating to make this hearing a successful one and I am going to comply with your suggestion, Senator Symington, and yours, Senator Saltonstall, and I will be glad to have any others.

Senator Case, I will talk to you after the hearing on this and we will pursue it further.

Senator Stennis, will you proceed with the examination?

Senator STENNIS. Mr. Rockefeller, I think the American people owe you and your associates a great debt for your very splendid work, and the fine presentation, too, that you made in that report.

I am not going to repeat here now these points that you made except to say this: that during all of these hearings I have been tremendously impressed with the fact that the fruit of what we have now is due so much to the foresight of someone years ago, particularly with reference to research.

Now, I was particularly impressed with your recommendations that the research and development program should be turned over to one single authority, and you selected the Secretary of Defense.

You also recommend, as I understand, that he specifically have the authority to assign the different projects, after looking over the whole field, that he can assign or transfer different projects; is that correct?

Mr. ROCKEFELLER. That is correct, sir.

Senator STENNIS. And then you recommend that the appropriation for research and development be appropriated directly to the Secretary of Defense for his use; is that correct?

Mr. ROCKEFELLER. No. We did not recommend that the total power for procurement, research, and development be given to the Secretary. We recommended that he have authority as to how it was used and that he have specific appropriation made to the Secretary's Office so that he could undertake whatever programs he felt necessary.

But because of the size of the program it seemed that these things could be developed in the three services, and then he would have authority to make transfers in the light of later information and knowledge that was essential.

Senator STENNIS. Of course, they would largely originate the projects, but he would have control of them to the extent of controlling the money; is that correct?

Mr. ROCKEFELLER. That is correct.

Senator STENNIS. Now, do you not think if we had had a program like that, or similar to it that we would be further along now with our research program?

Mr. ROCKEFELLER. I do not think there is any question——

Senator STENNIS. And the achievements that would come from it?

Mr. ROCKEFELLER. I do not think there is any question on that, sir.

Senator STENNIS. And you therefore think it will go faster than the new program.

Now, have you or your panel looked into the requirements of the change in the law? Would there be any change in the law necessary to carry out such a plan now, or could the executive branch of the Government carry it out without express legislation?

LEGISLATION NECESSARY TO IMPLEMENT RECOMMENDATIONS

Mr. ROCKEFELLER. We did not make an extensive research of this question of how any and all of these changes could and should be made, but it would be my personal opinion that it would take legislation to accomplish the recommendations we made here.

Senator STENNIS. And you personally concur in this recommendation on the research and development; is that correct?

Mr. ROCKEFELLER. In every phase of it; absolutely correct.

Senator STENNIS. Was this a part of your personal study? I would like to know that.

Mr. ROCKEFELLER. Well, the recommendations were developed by the subpanel. I have been interested in this subject and concur completely in their recommendations.

Senator STENNIS. You have given the general subject your personal attention.

Mr. ROCKEFELLER. I have, sir.

Senator STENNIS. Thank you, sir.

That is all, Mr. Chairman. Thank you.

Senator JOHNSON. Thank you very much, Senator Stennis.

Mrs. Smith.

Senator SMITH. Mr. Chairman, thank you.

Mr. Rockefeller, what legal authority does the Secretary of Defense need that he does not now have?

Mr. ROCKEFELLER. Well, just using as an example this question of control of funds, the right to transfer funds. First, the control of procurement, research, and development.

He does not have absolute control over those now, and he does not have the authority to transfer funds or cancel funds. So that area is an example of the responsibility.

Senator SMITH. Will you, for the record, make recommendations of other changes that you believe are necessary for the Secretary of Defense to have?

Mr. ROCKEFELLER. Well, the testimony, Senator Smith, is reflecting the thinking and the agreed position of the group.

The changes which we recommend, which I took the liberty of reading before, cover the organizational structure as a whole; then certain steps in relation to budgetary matters and also in relation to international cooperative arrangements with our alliances.

Senator SMITH. It has been my understanding that the law provides all of the legal authority that the Secretary of Defense needs to carry on the defenses for the country, and that is why I would like the benefit of the thinking of your group.

Mr. ROCKEFELLER. Well, on that, I might say this question was raised in 1953 at the time the Reorganization Committee of the Defense Department was working, and the four names which the chairman just mentioned to come before you were all advisers of that group.

This question is a moot question. You can get opinions on both sides as to whether he actually has all the authority or not.

Authority is given directly by the law in various places to the three services, although legal counsel interprets the fact that the subsequent authority of the Secretary of Defense as given him by the Congress supersedes those and that he has the authority necessary.

It is a matter of dispute, and up to the time of 1953, his authority had been challenged and successfully challenged by practice, by all three services.

Senator SMITH. Mr. Rockefeller, following up on Senator Saltonstall's questions on civil defense, how would you feel about manning civil defense throughout the country with reservists who are not on extended active duty?

Mr. ROCKEFELLER. Senator, I would say that it would depend considerably upon what functions were going to be carried out by civil defense, but certainly they would have a very important part and could render a tremendously useful service.

I think that a definition of their function in relation to the service would depend on the functions that were going to be carried out.

Senator SMITH. Well, as you visualize civil defense that is needed, what would you say?

Mr. ROCKEFELLER. Well, if there were a shelter program and that shelter program were to be carried out in close cooperation with the State and local governmental units, whether the reservists would be the best people to work with the local communities or whether that could be carried out through some other branch of the Federal Government would be a question, I should think.

Senator SMITH. You have no recommendation on that?

Mr. ROCKEFELLER. No; we did not suggest that further.

Senator SMITH. Have you any personal thinking on it?

Mr. ROCKEFELLER. Well, my personal feeling, Senator, would be very much determined by what actually develops in the way of a program. A program it seems to me comes first and then the organization to carry it out and then who best can be involved in the operation of it.

Senator SMITH. I was interested in certain statements which your group made with respect to the defense organization in your report released a few days ago.

At page 43 of your report the following statements are made:

In exercising the functions of arbitration and control, the Secretary of Defense and his staff have become overwhelmed with many administrative tasks which, were it not for deep-seated interservice rivalry, could be better handled by the individual services. This condition is reflected in the ever-increasing number of Assistant Secretaries of Defense and the heavy emphasis of the Secretary's Office on financial controls at the expense of strategic doctrine.

Mr. Rockefeller, there is a strongly implied criticism of the number of Assistant Secretaries of Defense if not an actual expression of disapproval of the number of Assistant Secretaries of Defense, in the phrase "the ever-increasing number of Assistant Secretaries of Defense."

Now not only as a member of the Armed Services Committee but also as a ranking Republican on the Reorganization Subcommittee of the Government Operations Committee, these statements of your 1958 report criticizing the number of Assistant Secretaries of Defense are of particular interest to me in view of the recommendations made by the Rockefeller committee you headed 5 years ago in 1953, recommendations which proposed the creation of six additional Assistant Secretaries of Defense at that time.

This was one of the major recommendations made by your group on April 11, 1953.

Since your group in 1958 complains about the ever-increasing number of Assistant Secretaries of Defense, will you tell the committee what has prompted you to change your conclusions on this point or explain what otherwise appears to be a reversal of position in 5 years?

Mr. ROCKEFELLER. I think you go right to the heart of the question here, Senator Smith, and a very helpful question to bring out.

At that time, in the 1953 report, the Commission which made the study recommended the maintenance of the existing system of roles and missions and the existing system of Joint Chiefs for the development of a combined strategy growing out of the strategic plans of the three services.

It was clear then, as pointed out in some of the testimony I read from earlier comments made by people associated with the Department, there were these problems in the Joint Chiefs of Staff in terms of service rivalry and the difficulty of reconciling differences.

It is not only in terms of doctrine, it is in terms of weapons, it is in terms of roles, it is in terms of the various functions, and budgetary questions as well.

What we tried to do in the recommendations in 1953 was to make that system work and to give the Secretary of Defense adequate staff and assistance so that in these various fields he could work out and develop the information for the Secretary's Office from the three serv-

ices through Assistant Secretaries in each one of these areas which would permit him to do the arbitration job.

Now, I think the problem has tremendously increased since 1953 as a result of the development of new weapons and particularly the whole missile program which completely cuts across all former service lines and changes tremendously the future significance of various functions of the three services.

Now we have come to the conclusion, I say we have, this group came to the conclusion that the system as recommended in 1953 no longer is feasible, nor is any longer in the interest of the country as a whole to get effective decisions and effective action, and that the Secretary cannot try to arbitrate the conflicts in the different positions between the three services.

Therefore, and I think that the way the statement reads is that as a result of his trying to do this he is having to have more Assistants to find out.

Now, if you remove the line of command from the three services and put it in unified commands, and if the three services do not develop strategic plans themselves but it is done in the combined staff under the direction of the Chairman of the Joint Chiefs, then you remove the basis for this conflict. Therefore, the Secretary would not need the number of people which he now has to try and be subarbitrators or subreconcilers or whatever you want to call them, but clear decisions could be made at the top and functions then carried out by services which would not be a conflicting basis.

You are very correct in pointing out there is a change in position but it is a very fundamental one. I think that the time has come when we have to face this in terms of a major structural change and that was the conclusion of the Commission.

Senator SMITH. And you approved of the change?

Mr. ROCKEFELLER. Completely.

Senator SMITH. Inasmuch as your 1958 committee attributes the cause of "the ever-increasing number of Assistant Secretaries of Defense" to the "many administrative tasks which, were it not for a deep-seated interservice rivalry, could be better handled by the individual services," if the elimination of the interservice rivalry would cause cutting the number of additional Assistant Secretaries, would not the more direct and simple approach be to merge all services into one service; in other words, would not that be the more effective, even if most severe, way of eliminating the deep-seated interservice rivalry which your group condemns?

Mr. ROCKEFELLER. Well, the committee didn't feel so. They felt that as things stood today, that the size of our whole Military Establishment is so great that there are technical differences of a major character in recruitment and training, policies established for air, for ships, for ground forces; that these establishments could very well function and serve the Nation in tremendously important and useful ways as they have in the past in recruitment, in training, and in logistics, and that to try and put them all into one tremendous structure would be, at this time, a detriment, rather than an asset.

Senator SMITH. Thank you, Mr. Chairman.

Senator JOHNSON. Thank you very much, Senator Smith.

● I should like to call the attention of the committee to the summary of the Special Studies Project of the Rockefeller Brothers Fund, entitled "International Security: the Military Aspect." I should like to include that in the appendix of the report.

Without objection that will be done.

(The report referred to will be found in an appendix hereto.)

Senator JOHNSON. Mr. Rockefeller, I am informed that there are ample copies of your report available. At least, I heard on Dave Garroway's program, I believe, that if one writes in right quick he can get one.

Could you supply the committee with a couple of hundred copies of the full report?

Mr. ROCKEFELLER. We would be very glad to.

Senator JOHNSON. I do not want you to have it reprinted.

Mr. ROCKEFELLER. I am only laughing because of the problem Dave Garroway got into on this subject. The response was more than he and we expected, but we would be delighted to supply you with 200 copies.

The mimeographed copies are available now, and the printed copies will be available Tuesday.

Senator JOHNSON. A copy of the complete report will be made available to the Senators, but we will put only the summary in the record.

Senator SYMINGTON, I must leave the room for a few moments. Would you preside during the time you question Mr. Rockefeller?

Senator SYMINGTON (presiding). Mr. Rockefeller, I would like to join my colleagues in congratulating you on this report. In my opinion, it is one of the finest reports that I have ever read, and you have been one of the finest witnesses that I have ever heard before the Senate in explaining it. There is a lot of interest in it.

I understand that Dave Garroway has already been asked for 250,000 copies; is that correct?

Mr. ROCKEFELLER. I am afraid it is, sir.

Senator SYMINGTON. Fortunately, you are one of the people who can afford to give it to him. [Laughter.]

Mr. ROCKEFELLER. Or unfortunately.

Senator SYMINGTON. Now, I was interested in the interrogation of you by our able counsel on the question of effort to eliminate duplication and waste through further unification.

Do you not think it is unfortunate that as soon as you talk about it, people immediately say: We don't want a single service, we don't want a single suit; we are not interested in the Prussian system, and that kind of thing?

Mr. ROCKEFELLER. Those catchwords have become so accepted that I am afraid they tend to stop careful analysis of the problem and careful thinking of the necessary remedies. I think your mention of it is very important because if we could just get away from that we could then consider the problem and what needs to be done without letting our mind freeze on a blind danger.

CIVILIAN HAS POWER TO FIRE

Senator SYMINGTON. Actually, whoever was presiding would be subject to instant dismissal by the civilian Secretary of Defense, would he not?

Mr. ROCKEFELLER. That is correct.

Senator SYMINGTON. And also by the President of the United States; is that not correct?

Mr. ROCKEFELLER. Absolutely.

Senator SYMINGTON. And so if we think the Prussian system means putting a military man in authority in our Government, we are already in a right tough situation, are we not?

Mr. ROCKEFELLER. That is the truth.

Senator SYMINGTON. Now, on the Cordiner report—you did not mention it in this particular part of your overall studies. Do you know of the Cordiner report?

Mr. ROCKEFELLER. I do, sir.

Senator SYMINGTON. Do you agree with it in principle?

Mr. ROCKEFELLER. Yes, I have not read it in detail, but we were very much in agreement with the objectives, and in our recommendations as to steps that should be taken in relation to budgetary matters, we recommended that increased funds be applied for salaries to maintain the caliber and quality of trained manpower in the services on a competitive basis with private employment.

Senator SYMINGTON. That was one of the recommendations in the fiscal part of your report; is that correct?

Mr. ROCKEFELLER. That is correct.

Senator SYMINGTON. And you have a panel of which Dr. Killian was a member that is coming up with more detailed personnel analyses on this matter?

Mr. ROCKEFELLER. Personnel and manpower. He was chairman of the committee, and it deals with the whole question of how does this country channel the manpower which it possesses into the areas where it is primarily needed, what are the incentives that would result in that channeling, both in training and in actual occupation.

I think that will come up in the subpanel recommendations.

Senator SYMINGTON. Did you feel, based on the President's talk yesterday, that he supported the idea of reorganizing the Department of Defense?

Mr. ROCKEFELLER. Very much so. I thought the fact that he had placed that first on his list of eight points, was very significant.

Senator SYMINGTON. So did I.

Have you any quotations showing how the President felt about it when he was a general? If you have, would you just submit them for the record?

My time is limited.

Mr. ROCKEFELLER. I will do so.

Senator SYMINGTON. Do you happen to know if you have any?

Mr. ROCKEFELLER. I do not know as I have it here. I know of his comments on the subject, and I saw them quoted in the press only a day or so ago.

Senator SYMINGTON. Would you be good enough to have your staff put them in the record, because I am confident they support your position.

Mr. ROCKEFELLER. We will do so.

(Requested information follows:)

EXCERPT FROM TESTIMONY BY GEN. DWIGHT D. EISENHOWER, MARCH 25, 1947,
BEFORE THE SENATE COMMITTEE ON ARMED SERVICES (DURING HEARINGS ON A
BILL FOR UNIFICATION OF THE ARMED FORCES)

Now, distinguishing my personal conviction as opposed to what I now believe we should recommend, I did recommend and I believed in the single professional Chief of Staff. But in my own defense, I must say that I recommended also that the first one should be a naval officer, because I believe in it from a matter of principle.

But I have come to the conclusion that it is one of those argumentative points that should be eliminated from the bill, as not being of great importance. Time may bring it about, and it may show that this is a better system.

Senator SYMINGTON. Thank you.

Now, are you telling this committee that there is no overall strategic plan for the United States to defend itself?

Did I hear that testimony correctly this morning?

Mr. ROCKEFELLER. That is our understanding of the situation.

Senator SYMINGTON. That in itself would be a great incentive to further unification, would it not, in the operating field?

Mr. ROCKEFELLER. We feel it is an essential step in that direction or an essential reason for that step.

Senator SYMINGTON. Dr. Kissinger was your executive director, in this study was he not?

Mr. ROCKEFELLER. That is correct.

Senator SYMINGTON. In his book he talked about something that you mentioned this morning—the difficulty of deciding when you were at a point you had to react; is that the strategy of ambiguity?

Mr. ROCKEFELLER. That is correct.

Senator SYMINGTON. Is that what we were discussing with respect to the growing danger?

Mr. ROCKEFELLER. That is correct.

Senator SYMINGTON. He also said, I believe, in his book that each service is now attempting to put itself in a position of being able to fight any future war by itself.

What would be your comments on that?

SOME OVERLAPPING NECESSARY TO COMPLETE MISSION

Mr. ROCKEFELLER. Well, I put it this way: that each service is making every effort to carry out its interpretation of its assignment of missions.

With the change in weapons technology and with the change in methods of war, its mission—in its interpretation—grows larger and larger and overlaps over the missions of others. But they are correct I think in their interpretation that to carry out their assignment they have to reach from the sea to the land or from the land to the air and so forth; and therefore perforce their interpretation makes them reach out to carry out their assignment.

Senator SYMINGTON. Specifically, if you had a chairman of the Joint Chiefs along the lines of your report, it would be very difficult, if not impossible, for the Air Force to give insufficient airlift to the degree that they have with respect to the Army, would it not?

Mr. ROCKEFELLER. Absolutely. It would receive a priority which was commensurate with the mission assigned.

Senator SYMINGTON. And perhaps our most experienced witness in that field said that one of the most important things that we should do, perhaps the most important from the standpoint of the submarine picture, was to have hunter-killer submarines.

We don't know how many hundreds the Russians will have by 1960, but we do know that they have over 500 from published statements by the Chief of Naval Operations and the Secretary of the Navy. And it is our understanding we plan one hunter-killer submarine by 1960. That was a statement made by Senator Jackson.

That is the type and the character of things that might be handled more correctly if we did have more concentrated direction of our strategic planning, is it not?

Mr. ROCKEFELLER. That was our feeling, Senator, that priorities would be given on the basis of overall strategic considerations and would not be based on the strategic concepts of the three separate services.

Senator SYMINGTON. Thank you, Mr. Rockefeller.

Now, there has been a lot of talk about czars.

Every time we get in trouble here we talk about a czar and then generally appoint another committee.

But as I got your thinking this morning, if we are going to have a czar in any field with respect to our Military Establishment, whether it be missiles or bombers or science and research, he should be the Secretary of Defense, should he not?

Mr. ROCKEFELLER. The real czar is the President, being the Commander in Chief.

Senator SYMINGTON. Right.

Mr. ROCKEFELLER. And then as he delegates to the Secretary of Defense, in a sense, his deputy commander in chief, he becomes the authoritative source, but ultimately the authority rests with the President.

Senator SYMINGTON. Based on your vast experience in industry, you cannot give a man the responsibility without giving him the authority at the same time, and expect the job to be done, can you?

Mr. ROCKEFELLER. I certainly agree.

Senator SYMINGTON. That is one of the unfortunate characteristics of the present law, which regulates the missions and prevents the Secretary of Defense from changing them; is that correct?

Mr. ROCKEFELLER. That is correct.

Senator SYMINGTON. Your conclusions and deductions in your report are really the important thing for the American people to know, would you not agree, as to how you all feel after studying this matter for a year and a half?

Mr. ROCKEFELLER. I certainly do agree. Particularly if you would include in the conclusions, the conclusions as to what the problem is because we feel very strongly that that is a must as far as the American people are concerned to understand what we are up against so that they can intelligently support the kind of programs in terms of action which you all have to face here in the Congress.

Senator SYMINGTON. And your conclusions were sanitized, you might say, from the standpoint of security classification, were they not?

Mr. ROCKEFELLER. That is correct. This report contains no security information that has not been released.

Senator SYMINGTON. If the conclusions of the Gaither committee were also sanitized, why should they not be given to the American people, too?

Mr. ROCKEFELLER. Well, I think there is an additional problem besides the release of the information. The committees established by the President or in the Executive Office for confidential studies have been traditionally kept on a confidential basis. And I think it does challenge the whole ability to get people to come from private life to make confidential studies and then afterward be put in the position of having that material released.

Senator SYMINGTON. You say that some of the members of the committee, after this report was declassified, would not like to see it published?

Mr. ROCKEFELLER. No, I do not mean that. I don't mean they might not individually, but the whole concept of being able to call in groups to have secret or confidential studies, I think, is a valuable one for our system, the President and the Security Council to have that capacity.

Senator SYMINGTON. Senator Kefauver brought in a point that was of great interest to me regarding your report, and that was that the concept of the single Chief or Chairman of the Chiefs, whatever you want to call it, only has to do with the military planning and operating.

Mr. ROCKEFELLER. Well, I am delighted you stress that because I agree, and we felt that that was an important factor in preserving civilian control, and also that his orders are derived from the Secretary and the President, so that the civilian control is there even in the military.

COMPRESSING INFLUENCE OF MISSILES

Senator SYMINGTON. The missile picture is steadily tending to draw the services together from the standpoint of the way they operate, eliminating the concept of one service in the air, one on the land and one on the sea, is that correct?

Mr. ROCKEFELLER. That is correct.

Senator SYMINGTON. Today we have a couple of wings of B-47's, perhaps that would be 90 bombers, on a base, and if it takes 60 seconds for a bomber to get off, that would take an hour and a half to get them all off. If an accurate ICBM came over here in 30 minutes we would lose two-thirds of the bombers, is that not right?

Mr. ROCKEFELLER. Unless the missiles are shot down on the way.

Senator SYMINGTON. I think we have had testimony that that will not be possible for some years after the offensive missile is operational.

Mr. ROCKEFELLER. That is correct.

Senator SYMINGTON. Is that the type and character of problem on which everybody should get together as you see the picture?

Mr. ROCKEFELLER. Under this other structure where it is not important any longer who is going to fire the missiles. I mean that becomes then not a major consideration.

Senator SYMINGTON. We had a sad hearing a couple of days ago when General Gavin, a dedicated man who wanted to stay with his

service felt he could do more for his country outside of the Army than in it and was not interested in any promotion aspect of it, but just frustrated. He just wanted to get his work done. On page 49 you say:

One of the major weaknesses in our strategic posture has been our inordinately long lead times. They have been produced in part by the cumbersome machinery in the Department of Defense. In part, they have been caused by a quest for perfection in development and by its corollary which is an overconcern with the avoidance of mistake. As our Government has grown, it has followed the familiar course into a system of rewards that favors caution and mediocrity. Punishment for inaction is rare, but retribution is swift and harsh for measures that were imaginative, risky, and failed. It is especially important that this pattern be reversed in a situation which is inherently uncertain and where great achievement is inseparable from great risk.

From the standpoint of lead time that is obviously correct. It is unfortunate, do you not think, that there should be such bitter disagreements between the services that some of our best men resign?

Mr. ROCKEFELLER. Yes, I do, and I think that is one of the urgent demonstrations of why there is need for a change in the structure, because they are in a sense the victims of a structure and not a criticism of the people that are involved in it.

Senator SYMINGTON. I could not agree with you more. When we start looking for a scapegoat, I think we will both agree that the culprit is the structure and not the individual.

Mr. ROCKEFELLER. That is right, and we do not have a right to sacrifice men of that caliber within that kind of structure.

Senator SYMINGTON. Thank you, Mr. Rockefeller. Senator Case.

Senator CASE. Thank you very much.

Mr. Rockefeller, I too appreciate the contribution which your organization has made in our thinking on this current problem.

I think that in that connection I want to say that personally, I feel that perhaps the most significant contribution you have made is what you have done in your discussion of defense organization and directing attention to the place of the roles and missions matter in our situation.

Now, I think some question was asked you for a recommendation as to change of legislation.

I have here the National Security Act of 1947 and I am referring to section 202, subparagraph (c) which reads as follows:

Notwithstanding any other provision of this act, the combatant functions assigned to the military services by sections 205 (e), 206 (b), 206 (c), and 208 (f) hereof, shall not be transferred, reassigned, abolished, or consolidated.

Is that the portion of the law that you think needs amendment?

Mr. ROCKEFELLER. That is correct, sir.

Senator CASE. And was there a reason why your organization in its report at page 38, in its discussion of defense organization, when it listed the three defects placed as No. 1, the report says:

These defects are three in number: (1) The roles and missions assigned to the individual military services have become competitive, rather than complementary, because they are out of accord with both weapons technology and the principal military threats to our national safety.

Mr. ROCKEFELLER. Correct.

Senator CASE. Did you regard that as basic in the defects of the present system?

Mr. ROCKEFELLER. Absolutely basic.

Senator CASE. In your discussion of that you say:

This rivalry is not due fundamentally to parochialism on the part of our military leaders; it is built into the present assignment of roles and missions.

At another point you stated, or the report states:

It is inherent in the philosophy and training of each service that it should see in any developing enemy threat predominantly those elements which its own particular organization seems best adapted to counter. And each service by a natural rationalization judges the proper balance of force to be the one which maximizes its own role.

That is where they are practically forced, you feel, to think that the war will be won or lost, dependent upon their development of the weapons to do it.

Mr. ROCKEFELLER. And if they did not feel that way they would not be doing what they felt was right in the assignment they have.

Senator CASE. Yes.

The following sentences in your report, and I think it is worth bringing into the record at this point:

A duplication of weapons systems and a wastage of scientific talent is inevitable.

That is under this concept of roles and missions?

Mr. ROCKEFELLER. Correct.

Senator CASE. Now to illustrate that, the chairman asked you whether or not you agreed with General White in feeling that his request or his recommendation for further appropriation should have been made, and you did.

Mr. ROCKEFELLER. Yes.

Senator CASE. And he asked a similar question with respect to General Gavin and you felt that his recommendation should have been followed?

INTEGRATED STRATEGY SHOULD PREVAIL

Mr. ROCKEFELLER. May I qualify there by simply saying that we felt large appropriations should be made, must be made in these areas.

How they should be spent, we feel, should be determined on an integrated overall basis, and we don't feel that we are qualified to say whether it should be this particular one or that particular one.

Senator CASE. Or that particular dollar amount?

Mr. ROCKEFELLER. Yes. Exactly.

Senator CASE. Supposing we had testimony to which we could directly refer as to the amount that had been requested by the Navy, would you think that the Navy request should be honored in the amount that was requested?

Mr. ROCKEFELLER. Well, our feeling was that basic to this request is the question of the roles and missions and the assignments, and until an overall—well, I can't say "until," but the development of an overall strategy will greatly facilitate the most effective determination of priority for expenditure; to get the best for the dollar spent?

Senator CASE. Well, that is exactly why I am asking these questions and relating it to this role-and-mission thing because this illustrates how the wasting of effort, wasting of money, wasting of weapons is almost inevitable when we are placing upon each service the responsibility of determining what it needs to accomplish its mission and there I think is the weakness.

Mr. ROCKEFELLER. That is exactly the conclusion we came to, Senator.

Senator CASE. It almost makes it, puts us in a position of being practically forced to accept or forced to say to each service:

You be the judge of your mission and you be the judge of how much money you need.

Mr. ROCKEFELLER. That is correct.

Senator CASE. Which of course is difficult when the President or the Congress in its appropriating responsibility has to determine the allocation of funds and determine upon the divisions to be made.

Mr. ROCKEFELLER. And when the expenses reach such tremendous figures.

Senator CASE. As a further illustration I remember during the war General Marshall said his greatest problem was that of local lights, that every local theater commander thought the war would be won or lost in his particular field and that is a proper way to feel about it.

Mr. ROCKEFELLER. Right.

Senator CASE. But now to get to the problem of how to correct that.

I was struck by the analysis that your report made that this division of functions had been based upon methods of locomotion, that is air, sea and land?

Mr. ROCKEFELLER. Yes.

Senator CASE. That the roles and missions were related to the locomotion but you point out revolutionary advances in technology have made the traditional functions increasingly obsolete.

The Navy now has sea, land, and air and that you have tactical air support shared by two or more services?

Mr. ROCKEFELLER. Right.

Senator CASE. Did you give consideration to the possibility of dividing the functions vertically rather than horizontally?

Senator JOHNSON. Senator Case, before he answers that question, I have an important correction I would like to make for the record with the understanding that it appear at the conclusion of Mr. Rockefeller's answer if you would yield for that purpose.

Senator CASE. Yes.

Senator JOHNSON. Mr. Chairman, I should like to point out to the committee and to those in attendance at the meeting this morning that I referred at one point in my interrogation to a reduction of approximately 40 percent that had been made in the request of the commander of the Air Missile Group.

The confusion arose as to whether that applied to fiscal year 1958 or fiscal year 1959.

I have reviewed the testimony and it applied to fiscal year 1958. In other words, their request for funds for fiscal year 1958—emphasize 1958, because I think I left the impression it was 1959, since I was under that impression—was reduced by approximately 40 percent.

Thank you, Senator Case.

Senator SYMINGTON. Mr. Chairman, may I ask a question for clarification?

Senator JOHNSON. Yes.

Senator SYMINGTON. How much of that was put back in the 1958 supplemental of \$1.2 billion?

Senator JOHNSON. I am under the impression that between 5 and 10 percent was put back—a very negligible amount.

I would not want to be positive about mathematics in my head. I have tried to figure it out and I think it is between 5 and 6 percent.

Senator SYMINGTON. I think it is an important point for the record.

Senator JOHNSON. A relatively small amount has been put back, I thank the Senator.

Senator CASE. Mr. Rockefeller, the problem of finding some other basis for dividing the roles and missions is a most difficult one.

Last summer when the Armed Services Subcommittee on Military Construction was wrestling with this problem as it came up in connection with determining whether we depend upon Nike or Bomarc for point or area defense, I ventured to make the suggestion that the President name a commission to study this particular problem, and suggested that they give consideration to having 2 forces; 1 land-based and 1 sea-based, but take off any restrictions as to the range in missiles or the horizontal top in suggesting to the Army you can take missiles that don't go beyond 1,500 miles and the Air Force takes them from there on up or things of that sort.

Did your committee give any consideration to the possibility of dividing vertically rather than horizontally?

Mr. ROCKEFELLER. The committee gave consideration to how best one could determine what elements should be used in the accomplishment of a mission. A point that came out very strongly in the discussion was that with the rapid change in weapons technology, that it would be very difficult to freeze anything.

Maybe what you are suggesting could be worked out and be very effective as of today. Maybe tomorrow or next year, the situation would change by developments that we do not see now. We felt perhaps it would be better, rather than trying to freeze it by specific congressional action as in the present legislation, to leave it up to the President, with flexibility to change these missions as defense requirements and weapons indicated, so that combined forces would be put together from the three services to make up whatever component was necessary to meet whatever particular defense problem we were faced with.

Senator CASE. I think your suggestion, or one phase of your suggestion was that above a certain level officer personnel be interchangeable.

Mr. ROCKEFELLER. That is correct. That was another phase of the same problem.

Senator CASE. Just one final question, if the chairman will indulge me.

At one point you referred to the vulnerability of points within 500 miles of the coast, and at another point you referred to the necessity for SAC having a 15-minute alert. Do you think with the submarine capability being credited to the Russians that we ought to have SAC bases, that we ought to establish SAC bases within 500 miles of the coast?

Mr. ROCKEFELLER. Frankly, that was not a question we considered.

We suggested greater dispersal of basis, funds for that purpose, and a shorter alert time. But we did not presume to know how that dispersal should be made or how the alert time should be achieved.

Senator CASE. Thank you, Mr. Chairman.

Senator SYMINGTON. Senator Ervin.

Senator ERVIN. I think the United States might very well draw wisdom from the Irishman who was a fugitive; he said that he was going to have peace if he had to whip the devil out of somebody to get it. And I think it is essential for us to realize that that may be necessary, and that we must be prepared, militarily speaking, to do that if it does become necessary. And for this reason I want to commend the forthrightness of the report of your committee.

I think you have contributed as much to waking up the American people as sputnik to this necessity.

Mr. ROCKEFELLER. You are very generous.

Senator ERVIN. That is all.

Mr. ROCKEFELLER. Thank you very much.

DIFFICULT TO KNOW HOW MUCH MONEY IS NEEDED

Senator SYMINGTON. Mr. Rockefeller, perhaps I am out of step, but it seems to me that people are approaching this matter from a wrong standpoint.

One of our colleagues thinks we should add a billion dollars, another, 2 billion. One thinks 5 percent more of our gross national product, which would still leave us well under what they say the Soviets are spending.

As I see this thing, what we ought to do first is decide what the danger is. After we decide what the danger is, on a long-term business-like planning basis, we shall go to work to get what we need to combat it in the shortest reasonably possible time. And after we have decided what that is, then we should organize ourselves along the lines of what you have been presenting this morning to get it at the least expensive price.

Is that not, as you see it, fundamentally the way this thing should be handled?

Mr. ROCKEFELLER. That was very much the conclusion the panel came to, and that was the reason we said we thought the things that were needed would cost in the neighborhood, on the best testimony we could get, an additional 3 billion each year for the next years up to 1965.

We did not try and give a total figure, because we could not estimate what savings could be made if these organizational changes were made.

Therefore, to get a total, was an impossibility as far as we saw it, and our figure would be very much the same as yours.

Senator SYMINGTON. You said 3 billion more, and the Gaither report is supposed to say 8 billion more without civil defense. Everybody seems to have a different figure, which in itself does not take into consideration the value of the dollar as of today against tomorrow. So it would seem to me that it is better to say what we need and then organize to get what we need in the fastest reasonable time at the minimum cost. Would you agree on that?

Mr. ROCKEFELLER. We certainly would.

Senator SYMINGTON. Thank you, Mr. Rockefeller.

Mr. Counsel.

Mr. WEISL. Mr. Rockefeller, I believe your panel stated just that when on page 89 you said:

When the security of the United States and of the free world is at stake, cost cannot be the basic consideration.

Senator SYMINGTON. Mr. Rockefeller, I would like to say that it is a source of great inspiration to those of us who believe in the American way of life to find a man in your position devoting his wealth, his time, and his great talents to the service of our country.

Mr. ROCKEFELLER. You are very generous, and I thank you, sir.

Mr. WEISL. Mr. Rockefeller, the chairman of the committee called my attention to a statement in your report which is as follows:

Earth satellites are a special adaptation of missiles which explore a new frontier in outer space and which will have important military application.

And our chairman in a review of the testimony here and the conclusions that were reached stated:

First, it is obvious that the Soviet valuation on the significance of control of outer space has exceeded that of our officials.

Secondly, it is equally obvious that our valuation has been based on factors other than the fullest realization of our scientific capability.

In essence, the Soviet has appraised control of space as a goal of such consequence that achievement of such control has been a first aim of national policy. We, on the other hand, have, or so the evidence suggests, regarded other goals and aims as having a higher imperative.

Do you agree with the chairman's statements?

Mr. ROCKEFELLER. I think the Committee definitely agrees with the chairman's position that this whole area of outer space is of major importance to our country and important in terms of security.

The only question I would have would be the use of the word "control" of outer space.

Mr. WEISL. Yes. The chairman did not mean control by any nation or any person, but to see that outer space is not controlled by our enemy, real or potential.

Mr. ROCKEFELLER. Correct.

Mr. WEISL. We have had testimony from Dr. Teller, Dr. Bush, Dr. von Braun, the heads of the research divisions of the Army, the Air Force and the Navy, to the effect that preventing outer space from being controlled by a real or potential enemy is of primary importance, and may be as of great importance as control or preventing someone from controlling the sea or the air. Do you agree with that?

Mr. ROCKEFELLER. The prevention of control, it seems to me, is definitely—

Mr. WEISL. Yes, that is what the chairman had in mind all the time.

Mr. ROCKEFELLER. Thank you very much, sir.

Mr. WEISL. Are there any statements that you would like to make that have not been covered by the Senators' questions or my questions, Mr. Rockefeller?

Mr. ROCKEFELLER. One of appreciation for the kindness and courtesy of the members of the committee and yourself.

Mr. WEISL. If I may, Mr. Chairman, I would like to associate myself with the Senators in stating that I just can't pay sufficient tribute

to Mr. Rockefeller. He has today, as he has in the past, rendered a great service to the country and to our people.

Thank you, very much.

Mr. ROCKEFELLER. I would just like to say I think you are overly generous. I am reflecting the work of 50 people, and therefore I am getting a lot of credit here I would like to associate with the group as a whole.

Mr. WEISL. I will amend my remarks to include those people.

Mr. ROCKEFELLER. Thank you, very much.

ADEQUACY OF THE NEW BUDGET

Senator JOHNSON. I have 2 or 3 questions I would like to sum up with. We have read in the papers, Mr. Rockefeller, that the President's defense budget for fiscal year 1959 will be in the neighborhood of a little over \$39 billion of new funds, or perhaps a total of new and old funds of \$39.5 billion. Do you think that is adequate?

Mr. ROCKEFELLER. I have not seen the budget, Senator.

Senator JOHNSON. I did not ask you if you had seen it. I asked you if you thought \$39.5 billion was adequate for the military budget next year?

Mr. ROCKEFELLER. This gets to the question we were discussing just a minute ago. If you make certain changes in the structure, what savings can be made as a result of that? What we do say is we feel there should be an increase in the neighborhood of \$3 billion. In his statement yesterday—

Senator JOHNSON. \$3 billion on top of what?

Mr. ROCKEFELLER. A year for the next ensuing years.

Senator JOHNSON. On top of the \$39.5 billion, on top of the \$36 billion, or on top of what?

Mr. ROCKEFELLER. But that is what we do not know; because, if these changes in organization are made, we feel that substantial savings might well be made, and therefore we did not want to make a flat statement, as I was explaining in answer to a previous question.

We did not know what that total of existing functions would be, so we confined ourselves to saying what we thought ought to be strengthened or increased.

Senator JOHNSON. It seems to me there is a lot of difference between increasing by \$3 billion and increasing \$36 billion by \$3 billion or increasing \$39 billion by \$3 billion.

Now, you want to increase by \$3 billion a year, as I understand it?

Mr. ROCKEFELLER. That is correct.

Senator JOHNSON. The President is going to ask for \$39 billion. Do you want that to be \$42.5 billion?

Mr. ROCKEFELLER. If savings cannot be effectively made in the present program without damaging the existing functions, then I would say it ought to be \$3 billion on top of the existing figure.

Senator JOHNSON. Fine. Now, what year did you first serve the Government?

Mr. ROCKEFELLER. 1940.

Senator JOHNSON. There have been a lot of reorganizations around here since 1940, have there not?

Mr. ROCKEFELLER. Continuous.

Senator JOHNSON. I had been 9 years in the Government service when you came here in 1940. I came here in 1931. Have you ever seen any reorganization that did not cost us more after it was made than it did before we started?

Mr. ROCKEFELLER. Well, that is a pretty leading question, Senator.

Senator JOHNSON. Well, if you have seen such a reorganization, I would like for you to point it out. Have you seen one where we really saved money? I am talking about the Congress. I am talking about interdepartmental changes. I am talking about the entire executive branch. I am talking about the judiciary. We reorganized it, set it up with expert administrators and so forth. But it seems to me that each time we reorganize, it costs us more money. Now, I do not know that that will always be true, and I want to be hopeful and optimistic and believe that we can make some reductions, but if you have seen any—and you are kind of an expert on reorganizing—I would like for you to point it out.

Mr. ROCKEFELLER. I would put it this way, Senator, and I feel very strongly. I think reorganizations actually can in many cases cut costs in organizational expense in departments and agencies. However, the problem is that we have a very dynamic and growing country, with a growing population demanding increased services, plus increased defense problems and responsibilities. While I think that reorganizations have contributed to reduction in cost, the growth of our country and the growth of our Government has counterbalanced those savings. Costs might have been even higher if there had not been reorganizations.

Senator JOHNSON. I understand what you are saying and I think there is much merit to your position. I want to ask you this question: Should the organization for future development of outer space, in your opinion, be located in the Pentagon or be established in some civilian agency like the Atomic Energy Commission?

SECRETARY SHOULD DECIDE LOCATION OF SPACE AGENCY

Mr. ROCKEFELLER. Well, because of its intimate relation to the military aspects of our national security, it would seem to me that the Secretary of Defense should have prime responsibility in making the decision where it should be placed so that first responsibility will be to our national security.

Senator JOHNSON. Now, are you saying it should be under him or not? You ought to bear in mind it includes such nonmilitary things as control of the weather. Can we expect the Defense Establishment fully to develop peaceful uses of outer space when their budgets are already low and they are trying to get adequate weapon development and other things. We have the same problem here that we had when we set up the Atomic Energy Commission. The Congress and the country at that time decided that although there was a pretty direct relationship between defense and atomic energy work, that there ought to be a separate and independent civilian agency. I wonder if you do not think the same thing should happen as far as outer space is concerned?

Mr. ROCKEFELLER. We did not want to preclude it in the discussions, but we did not feel that we had enough information to warrant a decision in that respect, and that the man who would be in the key

position to know what should be done, in consultation with the President, would be the Secretary of Defense.

Senator JOHNSON. So you would pass that one for the moment?

Mr. ROCKEFELLER. That is correct, sir.

Senator JOHNSON. Do you know of any effective steps which could be taken through the United Nations for the development and control of outer space?

Mr. ROCKEFELLER. I should think that they could have a very major part in this in respecting the combined interests of the ninety-odd nations which are members. Just what the nature of that would be, I would not be in a position to say.

Senator JOHNSON. Are you aware of any effective steps that are being taken through the United Nations?

Mr. ROCKEFELLER. In the control of outer space?

Senator JOHNSON. The development and control of it?

Mr. ROCKEFELLER. I think the geophysical year comes closest to where there is a combined U. N. program of action in that field.

Senator JOHNSON. You would not recommend giving some thought to taking effective steps through the United Nations for the development and control; would you?

Mr. ROCKEFELLER. I certainly would agree with that.

I think we have to constantly keep in consideration our own security in relation to what comes out of this.

Senator JOHNSON. Are any other nations in your opinion capable of developing outer space projects in the foreseeable future, that is other than the two great powers?

Mr. ROCKEFELLER. I really don't have the information that would give me a basis for judgment.

Senator JOHNSON. I think that is all, Mr. Rockefeller.

Senator SYMINGTON. Mr. Chairman, I have a question I would like to ask.

Senator JOHNSON. Senator Symington.

Senator SYMINGTON. Mr. Rockefeller, it is true that all businesses, successful as well as unsuccessful, are constantly reorganizing; are they not?

Mr. ROCKEFELLER. That is absolutely right.

Senator SYMINGTON. For example, we have at the top level what we call industrial engineers, and as we move down we call them time and motion study experts, and so forth; correct?

Mr. ROCKEFELLER. Yes, sir.

Senator SYMINGTON. If it is true that we are inefficient now, in this by far the largest part of our budget, that is the Department of Defense, and if it is true we cannot become efficient through reorganization, then our way of life, namely, military strength through economic strength, cannot live as against totalitarianism, can it?

Mr. ROCKEFELLER. I could not accept the second premise.

Senator SYMINGTON. I say if those premises are true.

Mr. ROCKEFELLER. If it were true, I would go along.

Senator SYMINGTON. In other words, we have to be efficient, because we can only get our military strength from our economic strength?

Mr. ROCKEFELLER. That is correct.

Senator SYMINGTON. As President Eisenhower said, in a totalitarian state the coin of the realm is the order of the dictator?

Mr. ROCKEFELLER. Right.

Senator SYMINGTON. But over here we cannot operate on that basis, can we?

Mr. ROCKEFELLER. That is the truth.

Senator SYMINGTON. So if we cannot get efficiency in our Defense Department, and it steadily takes more money in order to put us in an equal position with the Communists, then we are in for a pretty rough show, aren't we?

Mr. ROCKEFELLER. We would have to sacrifice a great many things.

Senator SYMINGTON. Thank you, Mr. Rockefeller.

Mr. ROCKEFELLER. Thank you, sir.

Senator JOHNSON. Any other questions?

Mr. Rockefeller, on behalf of the committee, I want to express our deep appreciation to you for coming here this morning. We hope that millions of Americans will share your determination that the country have an adequate defense in order that some day we may not be forced to go into combat with a broken sword.

We think that you have made a substantial contribution in informing our country, and we think an informed country will be an aroused country, and under our processes we can get effective action.

We will want to maintain contact with you and the distinguished group of Americans who are associated with you in your study, and we hope that you will feel free to give to this committee and to the Congress your suggestions from time to time, as well as any criticisms you may have that you think would be in the national effort and helpful.

Mr. ROCKEFELLER. I appreciate it very much, Senator, and I would like to say on behalf of the committee how much respect all of us have for the effort that is being made here and the information and experience that you men are bringing to the public through these hearings.

Senator JOHNSON. I don't know of any better time to end this hearing than right now on that note.

The committee will take a recess until 2:30.

(Whereupon, at 1:20 p. m. the committee recessed, to reconvene at 2:30 p. m. of the same day.)

(For convenience, summary of Panel II Report titled "International Security—The Military Aspect," is included in the record at this point.)

AMERICA AT MID-CENTURY SERIES

SUMMARY INTERNATIONAL SECURITY—THE MILITARY ASPECT

Panel Report II, Special Studies Project, Rockefeller Brothers Fund, Inc.

A STATEMENT OF MAIN POINTS

The Special Studies Project of the Rockefeller Brothers Fund, Inc., is an attempt to assess major problems and opportunities which are likely to confront America over the next ten to fifteen years.

This report on international security is the work of Panel II which is one of seven panels. The others deal with United States international objectives, foreign economic policy, domestic economic and social objectives, education and manpower, the democratic process and the moral framework of national purpose.

Thus security was only one of our concerns. While it is the most urgent, it is not in the long run necessarily the most important. We are concerned with national security because we *must* be. We are concerned with more positive tasks because we *want* to be. Security defines our military necessities. Our other panels will deal with our hopes and our humane necessities.

It is the judgment of the panel that prepared this report that all is not well with present U. S. security policies and operations. The over-all U. S. strategic concept lags behind developments in technology and in the world political situation. Defense organization is unrelated in major ways to critically important military missions. Systems of budgets, appropriations, and financial management are out of gear with the radically accelerating flow of military developments. The United States system of alliances must be adapted to constantly changing strategic requirements. The United States is rapidly losing its lead in the race of military technology.

We are convinced that corrective steps must be taken now.

We believe that the security of the United States transcends normal budgetary considerations and that the national economy can afford the necessary measures.

In brief the conclusions of the panel are:

I. The world knows that we would never fight a preventive war. But we and the rest of the free world must be prepared to resist any one of three types of aggression: all-out war, limited war, and non-overt aggression concealed as internal take-over by coup d'etat or by civil war.

II. In order to deter aggression, we must be prepared to fight a nuclear war either all-out or limited.

III. At present there are major shortcomings in our posture for both all-out and limited war. Our retaliatory force is inadequately dispersed and protected. Our active and passive defense is insufficient. Moreover, we lack mobility and versatility for limited war.

IV. Basic changes in our defense organization are recommended to correct the inefficiency and duplication of effort growing out of interservice rivalry.

(a) The military departments should be removed from the channel of operational command.

(b) All of the operational military forces of the United States should be organized into unified commands to perform missions which are called for by our strategic requirements.

(c) The Chairman of the Joint Chiefs of Staff should be designated Principal Military Advisor to the Secretary of Defense and the President.

(d) The staff of the Joint Chiefs of Staff should be organized on a unified basis and placed under the control of the Chairman.

(e) All officers above the rank of Brigadier General, or equivalent should receive their permanent promotions from the Department of Defense and would become officers of the Armed Forces of the United States.

(f) The line of operational command should be from the President and the Secretary of Defense to the functional commanders through the Chairman of the Joint Chiefs of Staff in his capacity as Principal Military Advisor.

(g) The line of logistic command should be from the President through the Secretary of Defense to the Secretaries of the three military departments.

(h) The Secretary of Defense should be given direct authority over all research, development, and procurement. He should have the right of cancellation and transfer of service programs together with their appropriations. He should also be given a direct appropriation for the conduct of research and development programs at the Defense Department level.

V. We must strengthen the regional groups of nations, not as an alternative to the U. N. but as its complement in line with Article 51 of the Charter.

VI. The U. S. must make a concerted effort to meet the joint security requirements of all partners in the alliances in which we participate by contributing to the development of a common strategic concept, by assisting in the reequipping of allied forces by fostering political cohesiveness and by economic and technical cooperation.

VII. We must pool with our allies in NATO scientific and technical information, and provide them with nuclear weapons and delivery systems.

VIII. Civil defense must be a part of our over-all strategic posture. A program must be undertaken to include a warning system and fall-out shelters.

IX. We must face the fact that a meaningful reduction of armaments must be preceded by a reduction of tensions and a settlement of outstanding issues that have divided the world since World War II. At the same time, concrete

proposals to limit such wars as might be forced on us should be introduced into negotiations on reduction in forces. Even if the Soviet Union should reject our proposals, a unilateral declaration might give it a strong incentive to follow suit.

X. Starting immediately, defense expenditures must be increased substantially over the next few years. Testimony indicates that current deficiencies in our strategic posture require additional expenditures each year of approximately \$3 billion for the next several years. This does not include necessary increased appropriations for mutual assistance and for civil defense. Because we must maintain our present forces as we go into production on new weapons, such as missiles, the cost of military programs will continue to rise until at least 1965.

Among other things, the panel recommends that:

(a) Aircraft procurement to modernize existing units be authorized into the 1960's while pressing for the most rapid development of operational Intermediate Range and Inter-Continental Ballistic Missiles.

(b) The SAC base structure be made less vulnerable to surprise attack through dispersion and other protective measures.

(c) An accelerated research and development support be provided for such key programs as missiles.

(d) Additional troop transport be authorized in the form both of modern aircraft and ships.

(e) The program of equipping both surface and underwater ships with missiles of various types be accelerated and additional funds for anti-submarine defense be provided.

(f) Military pay scales be raised to retain skilled officers and men.

A SUMMARY OF THE REPORT

I. Philosophy of The Report

As the twentieth century nears the end of its sixth decade, America faces a world in swift and often turbulent change. Both within our borders and beyond, enormous transformations—in human aspirations, in the structure of society, in economic development, in scientific knowledge—are reshaping the pattern of existence at a speed without parallel in history. The recurrent shock of our age is the discovery that concepts and patterns of action of a more secure past no longer fit the present reality.

We live in a period which insists continually on choice being made. But choice without purpose leads to paralysis or to fitful and erratic behavior. And power without a sense of direction may drain life of its meaning if it does not destroy humanity altogether. Our problems, therefore, require for their solution not only great effort and skill, but even more importantly steadfast conviction. And our opportunities will reflect above all the boldness and vision with which we face the future.

Despite the fact that the work of other panels is still in progress, we consider it appropriate to release this report on international security before the other studies are complete. Power alone will not supply an answer to the challenge of the future. It does offer the prospect that there *will* be a future. A people preoccupied as we are with the tasks of peace is always in danger of confusing its aspirations with reality, of refusing to believe that there may be states which prefer conquest to peace. Because we would prefer to dedicate ourselves to constructive tasks, we need constantly to be reminded that we are in great peril and that we cannot substitute our preferences for our duty.

This report concludes that we can afford what has to be done to insure our security; indeed, that we cannot afford less. We feel that we can achieve the necessary military power while preserving and expanding other elements of our strength, such as health, education, and economic growth. We recognize that this will require great exertion. But although the leadership of a democracy is a far more exacting task than the direction of a police state, the power which is generated by the voluntary effort of a free people cannot be equalled by the reluctant compliance of subject nations.

II. Developing Power Trends

Our military problem has four aspects:

(a) We require a growing industrial technological and scientific base in order to achieve a state of continual readiness for the long haul.

(b) Scientific development and industrial potential by themselves are ineffective strategically if they cannot be translated rapidly into operational weapons. Great importance therefore attaches to two kinds of lead-time: (1) the interval between the drawing board and operational weapon; and (2) the rapidity with which weapons are manufactured.

(c) At the same time, long-range programs and balance cannot become ends in themselves. However powerful we may be potentially, our strategic effectiveness in any given crisis depends on our active forces supplemented by any quickly mobilizable reserve capabilities.

(d) No matter how vast our over-all strength, it may still be ineffective in meeting certain challenges if it cannot be applied with discrimination. Henceforth, the adequacy of our Military Establishment will be determined by its ability to discharge two distinct though related tasks: one, to discourage an all-out attack through the existence of a powerful, instantly ready retaliatory force; and, two, to react effectively to limited aggression through the ability to make our response fit the challenge.

Four power trends appear to be of particular significance today:

(a) Weapon technology will become increasingly complex with a corresponding increase in the difficulty of choosing the most effective combination of weapons.

(b) The rate of technological change will increasingly complicate the tasks of the defense relative to the offense.

(c) The U. S. S. R. will continue to gain in over-all military strength greatly aided by Communist China and some of its other allies.

(d) The concept of "scarcity" in nuclear weapons will disappear from the calculations of the U. S., the U. S. S. R., and to a lesser extent Great Britain.

It appears that the U. S. is rapidly losing its lead over the U. S. S. R. in the military race. For perhaps the next two years, we still possess a superiority in strategic striking power and any Soviet attack on us would meet a crushing reply. But our position a year or two hence depends on decisions which must be taken immediately. Unless present trends are reversed, the world balance of power will shift in favor of the Soviet bloc. If that should happen we are not likely to be given another chance to remedy our failings. However, it is emphatically not too late if we are prepared to make the big effort required now and in the years ahead.

III. Three Types of War

We are confronted by three major threats to our security: All-out war, limited war and a kind of war new to the Twentieth century and highly developed by the Communists—the disguised or obscure war concealed as internal take-over by coup d'etat or by civil war.

1. *All-Out War*.—Of the threats to our security, all-out war is the most overwhelming. It can be defined as an attack of such magnitude that our survival would be directly and immediately at stake. Preparedness for all-out war must therefore be the first charge on our military establishment.

Preparedness for all-out war reflects a combination of three factors:

(a) *A retaliatory force* so powerful and well protected that, no matter what the scale of the enemy attack, the aggressor must always contend with a return blow which will inflict an intolerable amount of damage;

(b) *An active defense* which can assure survival of a sizable portion of the retaliatory force and which is able to limit the disruptive effects of an enemy blow on our population and economy to the smallest possible proportions;

(c) *A passive defense* which affords some protection for our population and our economy.

In looking at the strategic equation for all-out war there is reason for serious concern. Our retaliatory power is imperiled by Soviet advances in the missile field and by the inadequate dispersal and protection of our Strategic Air Command. Our active defense designed against manned planes will have to be redesigned for the missile age. Our civil defense program and that of our allies is completely inadequate.

2. *Limited War*.—Though all-out war is our greatest danger, it is not our most likely threat. If all-out war becomes our only counter to aggression, the Soviet Union may be enabled to use its strategic striking force as a shield behind which to achieve limited advances, confronting us in each case with the alternative of yielding to what will seem a marginal Soviet gain or of precipitating a world-wide holocaust.

It is imperative that in addition to our retaliatory force, we develop units which can intervene rapidly and which are able to make their power felt with discrimination of versatility. To conduct such a limited war, we require modern sea lift and an air lift capacity we do not now possess. Our mobile forces must be tailored to the gamut of possible limited wars which may range from conflicts involving several countries to relatively minor police actions.

3. Non-Overt Aggression.—Our security can be imperiled not only by overt aggression but also by transformations which are made to appear, insofar as possible, as not aggression at all.

It should be our aim to prevent such situations from developing. When they do become acute we may have a choice only between evils. Our security and that of the rest of the non-Communist world will then hinge importantly on our willingness to support friendly governments in situations which fit neither the soldier's classic concept of war nor the diplomat's traditional concept of aggression.

IV. Nuclear Weapons

In dealing with the use of nuclear weapons we come up against the hard fact that the choice is no longer entirely our own. Whatever we may decide, the Soviet Union may choose to conduct its aggressions with nuclear weapons.

Thus against a nuclear power we must always be prepared to fight a limited nuclear war. Even when we decide to use conventional weapons, we would not dare to do so without a nuclear establishment ready at hand. And in a war in which the U. S. S. R. is a direct participant, nuclear weapons will have to be used almost of necessity.

Even U. S. Soviet equality in nuclear weapons will not change the fact that nuclear weapons complicate the tasks of an aggressor and reduce the significance of Soviet numerical superiority in conventional forces.

V. Defense Organization

The major defects in the present organization are inherent in its present structure. They will be further aggravated by the passage of time. These defects are three in number:

1. The roles and missions assigned to the individual military services have become competitive, rather than complementary because they are out of accord with both weapons technology and the principal military threats to our national safety;

2. The present organization and responsibilities of the Joint Chiefs of Staff preclude the development of a comprehensive and coherent strategic doctrine for the United States. Since each member of the Joint Chiefs except the Chairman is the senior officer of one of the military services, its status and morale can never be far from his mind. With the best will in the world he often becomes an advocate of a service point of view rather than an over-all planner;

3. The Secretary of Defense is so burdened with the negative tasks of trying to arbitrate and control interservice disputes that he cannot play his full part in the initiation and development of high military policy.

The following changes are recommended:

- (a) The military services should be removed from the channel of operational command. Freed from their responsibilities for strategic planning and combat operations, the service chiefs and their civilian superiors could concentrate on tasks of management and logistics.

- (b) All of the operational military forces should be organized into unified commands to perform the missions which are called for by our strategic requirements. Each unified command would be a combined force with its own mission and trained to carry out a distinctive task.

- (c) The Chairman of the Joint Chiefs of Staff should be designated Principal Military Advisor to the Secretary of Defense and the President. The Chiefs of the several services would continue to serve on the Joint Chiefs of Staff but only advisors to the Chairman and with particular responsibility for the areas of logistics, training and procurement.

- (d) The staff of the Joint Chiefs of Staff should be organized on a unified basis and placed under the control of the Chairman. A unified staff under the direct control of the Chairman would remove many of the service pressures on the members of the staff. The staff would assist the Chairman in his capacity as Principal Military Advisor to the President and the Secretary of Defense in strategic and operational planning.

(e) All officers above the rank of Brigadier General or equivalent should receive their permanent promotions from the Department of Defense and would become officers of the Armed Forces of the United States.

The procedure recommended here would retain the specialization necessary to command specific units and the morale which goes with membership in a service. At the higher levels, however, where the requirement is for an over-all view, the primary loyalty of all high-ranking officers would transcend service boundaries. Since entry into this group would be the goal of most if not *all* officers throughout their careers, junior officers would know that their future would depend on their ability to take a broad view, rather than on the ability to defend the point of view of their service on interdepartmental committees.

(f) The line of operational command should be from the President and the Secretary of Defense to the functional commanders through the Chairman of the Joint Chiefs of Staff in his capacity as Principal Military Advisor.

(g) The line of logistic command should be from the President through the Secretary of Defense to the Secretaries of the three military Departments.

(h) The Secretary of Defense should be given direct authority over all research, development and procurement. He should have the right of cancellation and transfer of service programs together with their appropriations. He should also be given a direct appropriation for the conduct of research and development programs at the Defense Department level.

VI. Alliances and the United Nations

The United Nations remains the greatest symbol of man's hope for peace and the most comprehensive organization working toward it. It has proved its ability to act in a number of situations from Korea to Suez. It is an indispensable forum for expressing the hopes of humanity and an effective institution for pursuing agreed ends.

Nevertheless, the Soviet veto and disputes extraneous to the issues can hamstring the machinery of the U. N. Until United Nations action is taken we should try to act in concert with the widest grouping of nations attainable as provided by Article 51 of the Charter. The system of free world alliances thus is not an alternative to the United Nations but its complement; it is the only means for collective security where the processes of the United Nations may be blocked or its action rendered ineffective.

VII. Pressure on the Alliance System

Our allies are faced with a situation in which, at one and the same time, the danger of war seems less imminent and the fear of the consequences of war grows greater. In Europe and in Asia, the Communist bloc is steadily improving its military capabilities, including nuclear weapons and delivery systems. The concern—assiduously fostered by the U. S. S. R.—that the use of even the smallest atomic weapon would involve enormous destruction may weaken the will to resist of many allies, in and out of NATO.

A correlative force contributing to the reluctance of many countries to make a substantial military effort is the growing cost and complexity of modern weapons. In many cases, the ability to resist locally is actually decreasing, while the need for it has become greater than ever.

The United States must therefore make a concerted effort, together with its allies, to develop and implement plans which meet the joint security requirements of *all* partners.

The free world is faced with a major task of strengthening and reequipping its forces at a time when both rapidly changing technology and, in many parts of the world, decreasing popular support for military programs combine to make the job extremely costly and difficult. It is probable that the United States will have to provide—either directly or indirectly—substantial quantities of equipment needed by our allies, or else see their political stability decline along with their military strength.

VIII. The Special Case of NATO

Three factors have been working to undermine the cohesiveness of NATO, which is militarily the most highly developed of our mutual security arrangements.

The first is the Soviet development of a large-scale air-atomic capability. This has led to speculation that the "sword" of NATO—the strategic air forces of the United States and the United Kingdom—may not be unsheathed in the

event of Soviet aggression on Europe for fear of a devastating attack on the United States and the United Kingdom.

The second factor is that recent trends in U. S. and British military policy have done much to discredit the NATO effort to build forces capable of resisting locally. Both countries have emphasized the massive deterrent at the apparent expense of forces needed for the local defense of Europe.

A third factor making for instability is the reverse of the above: a tendency on the part of some NATO allies to seek to escape their dilemmas by a policy of disengagement and neutralism. The retaliatory forces in the exclusive possession of the United States and the United Kingdom tend to produce a feeling of impotence inhibiting a major effort.

Fortunately there are two factors which seem to offer possibilities for a viable common strategy. The first of these is the disaffection in the Soviet bloc, so vividly illustrated in the cases of Hungary and Poland. The second, and more important, is the availability in quantity of tactical nuclear weapons.

Thus a prime element in the new strategy must be a significant strengthening of the NATO capacity for local defense. The United States must pursue with conviction this task of strengthening the shield forces, for it is equally in our interest to see that a conflict arising in Europe, either by design or by miscalculation, does not inevitably result in all-out war. But however earnest our effort to strengthen the shield forces, it will be unavailing unless our allies are prepared to make a substantially greater contribution.

A corollary of the central problem of establishing an adequate NATO shield is to provide within Europe—controlled by Europeans—an atomic and missile capability that will substantially reduce Europe's dependence on U. S. and British strategic air power. This is necessary to restore the declining power position of NATO vis-a-vis the U. S. S. R. and give reality to the European sense of participation, which is a basic ingredient of the will to resist.

To accomplish these objectives will require the following:

First of all, we must pool with our allies scientific and technical information and assist in mobilizing the research and development capability of NATO both in the civilian and the military field.

Second, we must strive for a true military interdependence which closely ties together the United States and the other NATO powers.

Third, we must acknowledge the necessity for maintaining in Europe for an indefinite period a strong contribution to the shield forces.

Finally, we must provide those of our allies that desire them with nuclear weapons and delivery systems, as well as with some of the other complex equipment of modern war. A step in the direction of these objectives was taken at the NATO Council meeting in December 1957.

IX. Civil Defense

Civil defense will not be easy, and it can never be complete. Difficulty does not mean impotence, however. While it may be impossible to protect the population against the blast and heat of an atomic explosion, protection against radioactive fall-out and other contamination appears to be more feasible.

It is possible to state certain general principles in relation to the development of any civil defense program:

(a) Civil defense must be considered as part of the over-all U. S. strategic posture.

(b) The American people need to be told more clearly the dimensions of the damage that would be inflicted on us by a sudden attack and about the measures to reduce its effects.

(c) A civil defense program should be integrated with the construction program needed for the normal development of our expanding population and economy.

An effective civil defense program can be separated into three stages:

(a) To provide warning, where possible, and information about radiological levels.

(b) Protection against fall-out. A fall-out shelter program could reduce casualties substantially.

(c) Protection against atomic blast and heat. A deep shelter program should be carefully studied.

X. Tensions and Reductions of Armaments.

The destructiveness of modern weapons has focused the hopes of mankind as never before on the attainment of a stable peace.

This panel, as all Americans, considers the achievement of a free and peaceful world the primary challenge before mankind. It would be highly irresponsible, however, to raise hopes which cannot be fulfilled or to hold out prospects which on closer examination prove to increase our peril.

We must realize that of all the outstanding issues, disarmament is the most difficult problem to settle directly.

A reduction of armaments is not meaningful unless it contains safeguards against violations of the agreement. But effective control has been complicated by the increasingly rapid advance of technology. Hence no reduction in standing forces, however scrupulously carried out, can protect a nation against a technological development in weapons which drastically changes the strategic balance.

Because a controlled and verifiable reduction in forces has proved so complicated, a major emphasis of disarmament efforts has turned to the prevention of surprise attack.

There is no doubt that the danger of surprise attack contributes to the tensions of the nuclear age. But with evolving technology it is questionable whether aerial inspection will significantly reduce the element of surprise. As the speed of planes increases, warning times will be progressively reduced. And in the age of the Intercontinental Ballistic Missile, which is close upon us, the maximum warning time afforded by even a perfect inspection system will be half an hour, the period of time the missile will be in transit.

This study has considered various suggestions for preventing the catastrophe of an all-out war caused by miscalculation or through the spreading of small wars. It seems doubtful that ground rules for the conduct of limited war could be established. Nevertheless, it would seem wise for the U. S. to include on the agenda of disarmament negotiations concrete proposals to limit such wars as may be forced on us to the smallest necessary dimensions. Even should the Soviet Union reject our proposals, they would serve to clarify our intentions and make less likely a war caused by miscalculation. Even a unilateral declaration which gave an indication of some of the steps we propose to follow to achieve the goal of reducing non-combatant casualties would give an opponent a strong incentive to follow suit.

The value of unilateral declarations is proved by the experience of World War II. Neither the Soviet Union nor Japan had ratified the Geneva Convention of 1929 with respect to the treatment of war prisoners. Yet on June 27, 1941 the U. S. S. R. informed the International Committee of the Red Cross of its decision to adhere to the convention and within a week of the outbreak of the war Japan announced that it would abide by the Prisoners of War convention. Though violations undoubtedly occurred, this indicates that both countries saw an advantage in projecting themselves before the world as subscribers to rules of war. Clear United States declarations, firmly adhered to, might provide a similar framework for mitigating the consequences of modern war.

XI. Budget

There is a grave reason for concern with respect to the inadequacy of recent levels of military appropriations as well as with respect to the workings of the budgetary process.

Programs of great importance to U. S. security now offer from insufficient funds. Several reasons have brought about this state of affairs. When the Korean War ended, it was natural that an effort be made to reduce military expenditures. But the execution of the reduction has had serious consequences which did not become evident for sometime because of a backlog of unspent appropriations.

Recent military expenditures are insufficient to maintain even our current force levels. And events have made clear the inadequacy of these levels.

Specifically, this panel recommends that:

(a) Aircraft procurement to modernize existing units be authorized into the 1960's. Otherwise a gap in ready forces between the latest type of manned aircraft and the operational stage in ballistic missiles seems inevitable.

(b) At the same time, we should press for the most rapid development and procurement of operational Intermediate-range and Inter-Continental Ballistic Missiles.

(c) The SAC base structure, long out of phase with other elements in its program, be made less vulnerable to surprise attack through dispersion and other protective measures.

- (d) An accelerated research and development support be provided for all key programs, including missiles and advance reconnaissance systems.
- (e) The SAC alert time be reduced.
- (f) This establishment of a retaliatory system based on missile launching submarines be expedited.
- (g) Our early warning and anti-missile defense systems be given greater attention.
- (h) Additional troop transport be authorized in the form both of modern aircraft and ships to provide the mobile units essential for limited war.
- (i) The Army be permitted to speed up the modernization of its weapons and its division structure.
- (j) The program of equipping both surface and underwater ships with missiles of various types be accelerated.
- (k) Anti-submarine warfare requires additional funds.
- (l) Present pay scales be raised to retain the skilled officers and men necessary to an effective and economic military establishment.
- (m) A start be made without delay on a program of fall-out shelters and related warning and communications equipment.
- (n) The reequipping of allied forces, particularly in NATO, with modern weapons be speeded up.

The Level of Effort

The above deficiencies in our strategic posture can be removed only by substantially increased defense expenditures. These increases will run into billions of dollars and must rise substantially in each of the next few years. This panel does not possess the data to determine the precise budgetary level. The best testimony it has heard indicates that the deficiencies noted above will require successive additions on the order of \$3 billion each year for the next several fiscal years. This figure does not cover the necessary increases in mutual assistance programs and in civilian defense. Because we must maintain our present forces, particularly of manned planes, even while we go into production on new weapons, such as missiles, the cost of military programs will continue to rise with no leveling-off likely before 1965.

The price of survival, then, is not low. This panel is convinced, however, that the increases in defense expenditures are essential.

CONCLUSION

We like to believe that reasonable men can settle all disputes through good-will and compromise and that power should be invoked only as a last resort. We therefore tend to think of diplomacy and force as successive and separate phases of national policy. Unfortunately, the position in which we find ourselves does not permit such absolute distinctions.

Force will not solve the problems of this period but the resolution to use it if necessary may afford the breathing spell in which nations can work out their own destiny without foreign interference. We must not forget that the neutrality of many nations is possible only as long as we are strong, just as for a century and half the British navy made possible our American neutrality. Many of our most vocal critics would be deeply troubled were the protection of our military strength suddenly withdrawn.

We are engaged in the phase of a global struggle which has come to be known as the cold war. In this report we have tried to set forth measures which we feel are imperative in the interest of national security. We consider them essential if we are to reduce the likelihood of war and to make sure that if in spite of all our efforts war should be forced upon us, we shall not be overwhelmed by it.

The cold war poses a two-fold dilemma: In our desire for peace, we must not overlook the importance of power in maintaining it. But once we have recognized the role of force we must forever beware that it does not become an end in itself. The more drastic the consequences of modern war, the more we must make certain that we are true to the principles the defense of which alone justifies resort to force.

When the security of the United States and of the free world is at stake, cost cannot be the basic consideration. The cold war cannot be won and a "hot" war cannot be avoided without a major effort. This is clearly not a time for complacency; it is just as clearly not a time for hysteria. What is required throughout the country is an attitude of sustained and informed determination.

If this report makes a contribution to the emergence of such an attitude, it will have served its purpose.

AFTERNOON SESSION

Senator JOHNSON. The committee will come to order.

We had anticipated a closed session, but during the lunch hour the Secretary of Defense called me and informed me of a new development that he was announcing this afternoon. He thought it was of such importance to the committee and the country that he should have General Medaris give us this announcement directly. If the general will present the information he has, we will have copies immediately made.

They are in the process of being made now, and they will be made available to you, after which the general will make a brief announcement for the television fellows, and then we will continue with our executive session.

General, you have previously been sworn.

General MEDARIS. That is correct.

Senator JOHNSON. So, proceed with your announcement.

**TESTIMONY OF MAJ. GEN. JOHN BRUCE MEDARIS, UNITED STATES
ARMY, COMMANDER, ARMY BALLISTIC MISSILE AGENCY**

General MEDARIS. Mr. Chairman, the Secretary of Defense, Neil H. McElroy, has authorized me to inform the committee today that the Army has been authorized and directed to proceed immediately—

Senator JOHNSON. Senator Saltonstall, during the lunch hour the Secretary of Defense called me and said that he wanted to inform me of a new development, and he thought it of sufficient importance to the committee and to the country that he was asking General Medaris to communicate it to us immediately upon our opening. We are therefore having an open session so that he may do that, and then he is going to make a brief statement for the television folks.

Then we will go back into executive session.

Go ahead, General. Start over, please. Senator Saltonstall was detained.

Senator Flanders, you are not leaving us, are you?

Senator FLANDERS. I will be back in 5 minutes.

Senator JOHNSON. You are going to miss this in 15 seconds.

Senator FLANDERS. There was a young reporter for the Navy Home I threw out, because I told her this was an executive session.

General MEDARIS. She is here, Senator. She got back in the other door. [Laughter.]

Senator JOHNSON. I want to observe that she is obviously a very enterprising reporter, and I am delighted that you are here.

Proceed, General.

General MEDARIS. Mr. Chairman and gentleman of the committee, Secretary of Defense, Neil H. McElroy, has authorized me to inform the committee today that the Army has been authorized and directed to proceed immediately and on a top-priority basis with the development of a solid-propellant ballistic missile which will succeed the Redstone liquid-propellant missile.

The Redstone missile is mobile, fieldworthy, and accurate in accordance with Secretary McElroy's statement. However, he has said that recent advances in solid-propellant technology resulting in large part from the Army's Sergeant and the Navy's Polaris programs make it possible to start development without delay of this solid-propellant missile.

It is as yet unnamed. It will be smaller, lighter, and even more mobile than the Redstone. The new solid-propellant missile will provide the Army a more versatile and flexible weapon with which to discharge its role on the ballistic field of the future, according to Secretary McElroy's statement.

Senator JOHNSON. General Medaris, I expressed my pleasure to the Secretary at his willingness to cooperate with us, and I should like for you to convey to him our appreciation for his keeping in constant touch with us.

We are very pleased that another important decision has been made. The committee has been impressed with the potentialities of solid fuels. I hope that this program will be backed up, not just with a directive, but with some immediate cold and usable cash, so that we can get maximum development in minimum time.

General MEDARIS. I am confident that it will be.

Senator JOHNSON. And if you will, please convey that message to the Secretary, we talk to him practically every day and we are pleased that he is making some decisions. Maybe it will provide some incentive to make some more.

Thank you.

Senator SALTONSTALL. Mr. Chairman, may I just say as the senior member on this side of the table that I join with the chairman in what he has said. And I hope that your statement means not only the direction to proceed, but also the funds with which to proceed.

Senator JOHNSON. Can you enlighten us on that, General?

General MEDARIS. Not at this moment, sir, because there is at least a 5-minute lag between the directive and the money.

Senator SALTONSTALL. At least a 5-minute lag.

General MEDARIS. Yes, sir.

However, I anticipate no delay in that direction.

Senator JOHNSON. Thank you very much, General.

The committee will take a 5-minute recess, so that the general may have the opportunity to make this announcement.

(Whereupon, at 2:40 p. m., the committee proceeded in executive session.)

INQUIRY INTO SATELLITE AND MISSILE PROGRAMS

MONDAY, JANUARY 13, 1958

UNITED STATES SENATE,
PREPAREDNESS INVESTIGATING SUBCOMMITTEE
OF THE COMMITTEE ON ARMED SERVICES,
Washington, D. C.

The subcommittee met, pursuant to recess, at 10 a. m., in the old Supreme Court chamber, United States Capitol, Senator Lyndon B. Johnson (chairman of the subcommittee) presiding.

Present: Senators Johnson of Texas, presiding, Kefauver, Stennis, Symington, Saltonstall, and Flanders.

Also present: Senators Ervin, Smith of Maine, Case, Bush, and Barrett, members of the Committee on Armed Services.

Edwin L. Weisl, chief counsel; Cyrus R. Vance, counsel; Gerald Siegel, associate counsel; Solis Horwitz, associate counsel; Daniel F. McGillicuddy, associate counsel; Stuart P. French, associate counsel; and Edward C. Welsh, staff adviser.

Senator JOHNSON. The committee will come to order.

The Chair will say that he will have to leave the committee at about 10:25 for a few minutes but will return just as soon as he fills another engagement.

The committee is very fortunate in having this morning an opportunity of hearing Gen. David Sarnoff.

General Sarnoff is a living symbol of what has been called the American dream. A onetime immigrant boy, he became president of the Radio Corporation of America when he was 39 years of age.

Under his leadership RCA achieved a position among the top 25 industrial companies in this country.

In September 1956 General Sarnoff marked his 50th anniversary in the field of radio, television, and electronics. His accomplishments are known throughout the world. He has served as adviser to three Presidents of the United States. He was the second man to receive the James Forrestal Memorial award. He has received the Army's highest civilian award for his exceptional service in promoting significant understanding and cooperation between industry and Government in the interests of national security.

General Sarnoff saw active overseas duty in World War II. He holds the Legion of Merit and the Medal of Merit. This is a man whose career is an inspiration to all Americans. We appreciate his coming here to give us the benefit of his testimony.

I would like to insert at this point in the record a brief biographical sketch of General Sarnoff.

(The sketch referred to is as follows:)

BIOGRAPHY OF GEN. DAVID SARNOFF

Brig. Gen. David Sarnoff, chairman of the board of the Radio Corporation of America, was elected president of RCA in 1930 at the age of 39, having advanced from messenger boy to wireless operator, from commercial manager to executive vice president.

Under his leadership RCA achieved a position among the top 25 industrial companies in the United States. He served as president of RCA from 1930 to 1947 and chairman of the board and president for the following 2 years.

Since 1949 he has served as chairman of the board and chief executive officer of the corporation. With experience in military radio dating back to World War I when he played an important part in helping to equip the American forces with wireless General Sarnoff was appointed lieutenant colonel on December 11, 1924.

He completed a course of studies at the War College, Washington, D. C., in 1927. His promotion to the rank of colonel came on December 23, 1931, and he was elevated to brigadier general on December 6, 1944.

During World War II General Sarnoff served on the staff of the Chief Signal Officer in Washington and later overseas as special consultant on communications at General of the Army Dwight D. Eisenhower's headquarters at SHAEF.

For his war services he was awarded the Army's Legion of Merit and President Harry S. Truman presented him with the Medal of Merit for Services of "inestimable value to the war effort."

The French Government decorated him with the Cross of Commander of the French Legion of Honor. On October 22, 1952, the Secretary of Defense of the United States appointed General Sarnoff Chairman of the Citizens Advisory Commission on Manpower Utilization in the armed services.

On August 5, 1955, he submitted to Gov. W. Averell Harriman, of New York, a memorandum on "civil defense planning" which the Governor in turn presented to the governors conference in Chicago, Ill., on August 12. In November 1955 President Eisenhower appointed General Sarnoff Chairman of the National Security Training Commission and this appointment was unanimously confirmed by the United States Senate.

In May 1956 he received the Army's highest civilian award for exceptional service for his "key role in marshaling public opinion and bringing about a better understanding of the Reserve component program of the Army."

In presenting this award Secretary of the Army Wilber M. Brucker said "Throughout his eminent career as one of the Nation's outstanding industrialists and leading citizens General Sarnoff has been noteworthy for his personal contributions of time and effort to the military service in undertaking numerous responsibilities and assignments to assist the cause of military defense.

Senator JOHNSON. General Sarnoff, I understand you have a statement that you wish to place before the committee.

Would you please come forward?

General, it is customary that we swear in the witnesses.

Will you raise your right hand?

Do you solemnly swear that the testimony you give this committee will be the truth and the whole truth?

General SARNOFF. I do.

Senator JOHNSON. Be seated, General.

General, I understand you have a prepared statement.

If you will, just proceed in any manner you may desire.

TESTIMONY OF GEN. DAVID SARNOFF, CHAIRMAN OF THE BOARD, RADIO CORPORATION OF AMERICA

General SARNOFF. First, Mr. Chairman, I should like to thank you for your very generous observations and, as you know, I appear before you today in response to a request which I received from you as the chairman of this committee.

The critical area which your group is studying deserves the concern and attention of all our citizens.

To conserve the time of your committee, I should like, with your permission, Mr. Chairman, to come at once to the recommendations I respectfully submit for your consideration.

Senator JOHNSON. Very well.

Proceed, General.

1. THE ROCKEFELLER REPORT

General SARNOFF. First, the Rockefeller report. The first of a series of reports by the special studies project of the Rockefeller Brothers Fund, which was released last week, dealt in considerable detail with the military aspects of United States security.

While not a member of panel 2 which drafted this report, I am a member of the overall committee which approved it. I subscribe to its basic principles and recommendations.

The Foreword by the overall committee contains the following statement:

We have considered the draft of this report at various stages of preparation and we have gone over the final draft in full committee. Not every member of our group necessarily endorses every detail, but we have approved its substance, and we strongly urge implementation of its recommendations.

Section VI of this report, which deals with "Defense organization" and recommends certain changes in the present setup, already has stimulated considerable discussion. Obviously this is a debatable subject upon which well-intentioned men, inside and outside the military services, hold different views.

Having worked in both industry and Government, I have learned through many years of experience that the officers and the men and women of our Defense Establishment are a patriotic and dedicated group of people whose primary interest is the security of our Nation.

In recommending a principal military adviser to the President and the Secretary of Defense, the committee considered that the basic need in the Defense Department is to bring the roles and missions of the services into closer alinement with the tasks which have to be performed.

This need has been accentuated by the recent scientific and technological developments which have brought about revolutionary changes in military strategy and weapons. The proposal of unified functional commands seemed to the committee to be the best solution it could suggest for this problem.

Another objective is to free those charges with strategic planning from their present dual roles and to relieve them from the pressures of their separate military services.

The committee felt that this could be best accomplished by establishing a single service for general officers above the grade of brigadier general or its equivalent and by placing the Chairman of the Joint Chiefs of Staff in charge of strategic planning.

It may be pertinent to recall that the joint congressional committee which investigated the Pearl Harbor attack and made its report to the Congress on July 16, 1946, proposed as its first and basic principle that unity of command was imperative at all outlying sectors.

Considering the shrinkage of the world caused by modern science since that report was written, it would seem that the principle of unity of command is even more valid today—for no longer are there any outlying sectors. All the world, or any part of it, is just as exposed to attack now as was Pearl Harbor in 1941.

2. RESEARCH AND DEVELOPMENT FOR MILITARY PURPOSES

The suggestion has been made by others that research should be placed in a separate agency outside the Defense Department, similar to the present Atomic Energy Commission. This, I think, is neither necessary nor desirable at the present time.

I recommend that the Army, Navy, and Air Force continue their own research and development organizations in order to advance solutions of their special problems. As weapons become more complex, it is important that military people develop the operational concept, logistic support, and personnel simultaneously with the development of the weapons.

The Assistant Secretary of Defense, responsible for research, should have overall authority to coordinate the research programs of the Army, Navy, and Air Force, to make sure that the whole field is adequately covered, that the programs of the three services complement one another, and that unnecessary duplication is avoided.

Subject to the Secretary of Defense, and within the limits of the overall amount allotted for military research, he should have the authority and the funds to make such additional contracts for research programs as the Defense Department deems necessary.

3. BASIC RESEARCH

Basic research, the quest for new knowledge about natural phenomena, is the very foundation of engineering and technology. It cannot be neglected without ultimately weakening our entire scientific edifice.

In the present complex world of technology, no country can maintain a position of leadership unless it is willing to furnish a favorable climate and reasonable support for basic research.

In recent years, the pressure for quick results has focused our main attention on applied research, on engineering, and on immediate requirements. As we apply the fundamental knowledge we have acquired, the need for more such knowledge becomes apparent.

Basic research is a continuing task of exploring the unknown. The very exploration uncovers new and challenging problems and possibilities. It opens up new vistas for advanced knowledge, leading to still greater accomplishments. The process is regenerative.

Today there is a growing realization of the dangers of neglecting this task, and the scientific community has spoken out vigorously on this score.

Congress should make available adequate funds for the National Science Foundation and thereby enable that agency to assume a major role in sponsoring and coordinating basic research.

We must develop an environment in which talented scientists can apply themselves to long-range objectives without feeling compelled

to fill immediate prescriptions for "hardware" in order to qualify for financial support.

It is vital that the American people should have a clearer appreciation of the role of science and the function of the scientist in our society. This would raise the calling of the scientist to a higher level in the public mind, and an enlightened and sympathetic public opinion is indispensable in the new space age.

4. SUBMARINES

All reports seem to agree that the submarine fleet the Russians now have is about 5 times as large as ours, and that they are building additional submarines at a much faster rate than we are.

If they do not already have them, it seems reasonable to believe that the Russians soon will have nuclear-powered submarines capable of launching intermediate-range missiles. This poses a threat to our entire system of defense, a threat that could conceivably be as imminent and potent as the ICBM.

This situation calls for the utmost effort and speed on our part to build up a fleet of nuclear-powered submarines and to improve our capability of detecting enemy submarines. Our program of missile launching from submarines deserves a major order of priority.

5. ANTIMISSILE MISSILES

I believe it is feasible to build an antimissile missile system that would provide worthwhile results and add to our national security.

I recommend an accelerated effort to produce such a system.

The challenge now facing us seems to me to make it advisable that the program of antimissile missiles be separated from the rest of the missile work. The Director of this project should report directly to the Secretary of Defense. He should have cognizance over the funds for research and procurement and should be vested with authority to make decisions as to systems and procurement.

He should work closely with the military services concerned with this equipment and the operating procedures it involves. The objective should be to bring antimissile missiles to an operational stage at the earliest possible time.

6. THE SATELLITE PROGRAM

My recommendation is that a coordinated program, using all available capabilities wherever they exist, should be organized under a single control. As of now, it is logical that this control be placed in the Office of the Secretary of Defense. The prime need is to pursue the military potentials, and to assess and counter the military threats of the space programs of others.

We should bring together all programs now in the several departments and orient them to the common purpose of obtaining the maximum amount of scientific data in the minimum time.

Our objective should be not only to get a satellite in orbit, but to obtain scientific facts about outer space as a basis for future developments in scientific and military programs.

As we proceed, it might become advisable to assign direction of certain aspects of the basic scientific work to some nonmilitary agencies of the Government.

7. LEAD TIME

In view of the rapid march of science and technology, and the significant competition America now faces, those charged with final responsibility for decisionmaking must be willing to accept a certain amount of risk which is inherent in any decision about new weapons or new methods for using them.

In such areas as we may now be behind the Russians, it may be prudent to go into the production of certain weapons even before their full development is completed. It is important to recognize that in such undertakings there is bound to be a certain percentage of failure, but this is an element in any program designed to speed our progress and strengthen our national security.

To shorten the lead time between research and production of military weapons, it is vital that decisions by those having final authority be made without unnecessary delay. Lead time could also be cut down by giving contractors more leeway in making technical decisions on matters which do not fundamentally affect operation of the weapons.

8. EDUCATION

The immediate and long-run problems of education and training call for serious attention and prompt action on the part of Government, educators, and the public generally.

It is necessary for the schools to stimulate in our youth a sense of high adventure in pushing forward the horizons of science, research, and invention. Boys and girls must be helped to feel the thrill of delving into the mysteries of science, and be made aware of the wonderful world to be opened up for the good of all mankind.

But, if we are to inspire more of our able and imaginative students to follow scientific disciplines, we need better trained teachers and wider use of the latest teaching aids.

We are faced with a shortage of qualified teachers, especially in physics, chemistry and mathematics. The fact that teachers are underpaid, that many of them can do better in private industry, is an important point that needs to be remedied. But this cannot be accomplished overnight. Nevertheless, some helpful steps can be taken immediately.

For example, I would urge prompt action on a proposal which I recommended publicly 2 years ago, at the annual dinner of the National Security Industrial Association.

At that time, I suggested the establishment of a national educational reserve made up of qualified teachers of mathematics and the sciences, to be drawn from the ranks of industry.

I proposed that industrial concerns release—with full pay for at least 1 year—a reasonable number of men and women for teaching assignments in nearby high schools. It is obviously impractical for any one company, or even a small group of companies, to carry out this plan. If it is to realize its full potential, it must have national sponsorship and a large number of companies behind it. It must also

have the backing of State education authorities who would have to certify members of this reserve to teach in their schools.

We could also improve and extend our educational facilities by more extensive use of closed-circuit television, which has been hailed by some educators as one answer to the twin shortages of teachers and schools.

The commendable pioneering work done by the Ford Foundation's Fund for the Advancement of Education already has demonstrated that teaching by TV has many advantages. It makes possible highly realistic scientific demonstrations that are otherwise out of the question in a small classroom. It extends the exhilarating influence of the best teachers far beyond the narrow confines of their own classes.

9. FINANCIAL BURDENS

There is one factor that overwhelms all others in answering the question: Can we afford to spend the additional billions necessary for our adequate defense? That factor is survival. Whatever we truly need for our survival represents essential expenditures. We can afford nothing less.

Moreover, we alone can afford to maintain a defense program at its proper level for our safety without endangering our economy or deteriorating our standards of living. But, if the choice must be made between securing our national defense and sacrificing our individual luxury, the decision is, of course, crystal clear. For, to enjoy luxury, and particularly the luxury of freedom, we must first survive.

10. COLD WAR

The challenge we now face is on three main fronts—the military, the political, and the economic. They are interrelated and interdependent. They are the essence of the cold war which Soviet Russia continues to wage relentlessly.

As the President said last week in his state of the Union message to the Congress, "The Soviets are, in short, waging total cold war."

In our necessary concentration on technology, we must not ignore the menace of Communist ideology, which is part and parcel of the same implacable challenge. We have seen how cleverly the Communist leaders exploit their technological advances to create a psychological impact upon people everywhere.

Sputnik has not only posed a challenge to our scientific leadership, but has also proved to be the greatest and fastest cold-war propagandist the world has ever seen.

It is late, but not too late, to face up to the imperatives of the cold war. In the battle for men's minds, Soviet successes have been due less to the genius of the Kremlin than to the lethargy of the West.

After all, we are not without opportunities for taking the initiative. The Soviet empire is racked by inner pressures, problems, and dangers. The enemy expertly exploits our internal tensions, yet his own tensions are vastly greater.

Our basic policy should be directed toward a program that assures our supremacy on the military, political, and economic fronts. It is

not enough for us to limit ourselves to an effort to catch up with Russia. To Russia should be assigned the task of catching up with us.

Our strength—in weapons, in diplomacy, in economics, and in spirit—must be such as to discourage the present Soviet strategy of intimidation and nibbling and to deter wider aggression. This position of strength would help to sustain and unite our allies and advance the cause of peace.

The patriotism of our people, the ingenuity of our scientists and engineers, the skill of our labor, the efficiency and productive capacity of our industrial plants, and the dedicated men and women serving in the Armed Forces and in other branches of our Government—all these make it possible for us to accomplish the necessary tasks, to preserve our freedom and maintain our status as the leading Nation in the world.

Thank you.

Senator STENNIS (presiding). General, you certainly have a strong statement here that will be useful to the committee and to the country. We want to especially thank you for coming here and giving the benefit of your views and recommendations.

Now, we will have each member to have an opportunity to ask you any special questions they may wish but, first, we will ask you to be examined now by Mr. Weisl, who is attorney for the committee.

Senator Johnson expresses appreciation to you, too, for coming, and expects to be back before you leave the witness chair.

General SARNOFF. Thank you, sir.

Senator STENNIS. Mr. Weisl?

Mr. WEISL. General Sarnoff, I am sure every member of the committee is deeply grateful for your enlightening statement. I take it that you believe that, if the United States displays a strong sense of urgency and does the things that have to be done, we have a chance to catch up with Russia or even to surpass Russia.

General SARNOFF. I most certainly do.

ROCKEFELLER REPORT BREAKDOWN

Mr. WEISL. In the Rockefeller report, the statement is made that in order to create properly the necessary defensive power for the United States, we should spend \$3 billion more each year, which, as I understand it, means \$3 billion the first year, \$6 billion the second, \$9 billion the third, up to a certain number of years; is that your understanding?

General SARNOFF. That is correct, sir.

Mr. WEISL. Has that \$3 billion item been broken down?

General SARNOFF. It has, by the committee which drafted the report, that is, the subpanel 2. It has been broken down in some reasonable form, and I have that breakdown here.

Mr. WEISL. Would you mind telling the committee how it was broken down, and into what items, General?

General SARNOFF. Generally, this statement shows that, on research and development, for example, the committee recommends for fiscal year 1959 a half billion dollars more than it understood was being spent on that item; fiscal 1960, \$700 million more, and fiscal 1961, \$900 million more. That is as far as this statement goes, just those first

3 years. Now, if you add those together, you have a total of \$2,100 million more for research and development in the first 3 years.

Mr. WEISL. Does that include both basic and applied research, General?

- General SARNOFF. I would expect this, primarily, to apply to basic research. Then it has, under "Strategic forces funds to improve SAC alert," SAC alert a half billion in fiscal 1959, a half billion in fiscal 1960, and a half billion in fiscal 1961.

SAC base construction and dispersion, a half billion in fiscal 1959, 1 billion in fiscal 1960, and 1 billion in fiscal 1961. As I indicated before, that means a half billion plus 1 billion plus 1 billion on top of that, so that would be $2\frac{1}{2}$ billion.

Additional aircraft and missile procurement, a half billion in 1959, a billion and a half in 1960, 3 billion in 1961.

Nuclear-powered submarines and antisubmarine measures, a half billion in 1959, 1 billion 3 in 1960, 1 billion 8 in 1961.

Limited-war forces, modernization of Army division structure, a half billion in 1959, 700 million in 1960, 700 million in 1961.

Troop lift, nothing extra shown for 1959, 300 million in 1960, 1,100 million in 1961.

Totaling these individual items would show an increase in 1959 of \$3 billion; in 1960, \$6 billion; and in 1961, \$9 billion, so that, for the first 3 years, this statement shows a total of \$18 billion over whatever the budget was at the time that the committee considered this.

Mr. WEISL. I notice, General Sarnoff, that, not included in those items, is an antimissile missile project.

General SARNOFF. That is right.

Mr. WEISL. And you strongly believe that such a project is not only desirable but feasible?

General SARNOFF. I do; and, also, there is not included here anything for civil defense.

Mr. WEISL. Would you care to state a little more extensively to the committee why you, as an industrialist, experienced in this field, thoroughly believe that an antimissile missile project is desirable and feasible?

General SARNOFF. Dealing with your second point first, if I may, I consider it feasible primarily because of the information that I have through discussion of the subject with my engineers and technical experts, and research scientists who are involved in this character of work, which, however, as you know, is highly classified. So that my technical conclusions are based largely on the information I have gathered on the subject, and the work that is actually going on.

As to the first part of your question as to why I consider it important, I can hardly think of anything more important than antimissile missiles, because, in the first place, they would furnish whatever protection science can furnish to the protection of our own bases, and particularly SAC, because if they are knocked out, then we lose our retaliatory capacity.

Secondly, to the extent that antimissile missiles are practical and functional and effective, to that extent you cut down the offensive power of the enemy.

In other words, if you have got a 50-percent kill, let us say, then he has got to have twice as many weapons or missiles to effect the job

that he may have in mind. So that I feel, based on the information I have obtained, that it is feasible.

Of course, no defense system will be perfect, and no defense system in the present state of science and technology can be relied upon to the extent of 100 percent, but as I have indicated in my statement, I think it is feasible, I think it is worthwhile, and I think it is urgent that we should proceed with all possible speed toward that development.

WARNING SYSTEM

Mr. WEISL. General Sarnoff, in order to make an antimissile missile system useful, we must have a warning system so that we know in time that a missile, an enemy missile is arriving or being delivered.

Now, the testimony that we have received indicates that we have no such warning system at the present time.

General SARNOFF. I am sorry to say that I do not believe that such warning system as we have at the present time in development—

Senator STENNIS. Pardon me. Repeat that, will you please? Is developing, did you say?

General SARNOFF. Such warning system as we have at the present time in development is not adequate to give us the warning in time that we would need to intercept a flock of missiles that might be coming our way. But I think that it is possible to develop the warning system beyond its present capacity, and I think that work is going on along these lines. But the antimissile missile system which I referred to will, as part of its development, have a suitable warning system which will function simultaneously with the kill.

Mr. WEISL. Have you any suggestions to offer to the committee at this time as to how this improvement in the warning system can be accelerated?

General SARNOFF. It can be accelerated by unified direction and concentration, and as I recommended in my statement, this ought to be a project wholly divorced from all the other projects, headed up by a suitable person reporting directly to the Secretary of Defense, and given the authority and the funds necessary to do that job. And he should have the power of decision, subject, of course, to the Secretary of Defense.

I think that that combination of circumstances would provide an organization capable of accelerating that effort.

JCS CHAIRMAN TO BE PRINCIPAL MILITARY ADVISER

Mr. WEISL. In the Rockefeller report, General, the recommendation is made that the defense setup be reorganized in many respects. First, they recommend that the Chairman of the Joint Chiefs of Staff be the principal military adviser to the Secretary of Defense and to the President, and that the members of the Joint Chiefs of Staff should be advisers and have no vote.

Do you agree with that recommendation?

General SARNOFF. I do, sir.

Mr. WEISL. You have no doubt heard the criticisms of that recommendation, namely, that it will Prussianize the American system, that it will lead to military dictatorship, that it places too much

power in the hands of one military man, and so forth. Would you care to comment on those criticisms?

General SARNOFF. I have heard those criticisms, of course, over the years, and I can understand those reactions on the part of those who have made the criticism, but I do not share those apprehensions, first, because I do not think Americans generally are made of the stuff that Prussians are made of. Secondly, I do not think that the Chairman of the Joint Chiefs of Staff would have any such power because he would still be subject to the Commander in Chief, who is the President of the United States. He would be subject to the Secretary of Defense, and he would be surrounded, of course, with the military staff and other advisers, and we would know what he was doing from day to day. And if he was the kind of a fellow that represented a danger, why, we would chuck him out before he got too far.

Also, his appointment is subject to the approval of the Senate as well as the President, and I think that the selection of the man would be such as to avoid those apprehensions.

I might add, for example, that there was certainly for a long time the tradition that it was dangerous to have a military man in the White House as President and the same fears were expressed more or less. Well now, we find that we have a general, a great general as President of the United States, and we find certainly that he is a man of peace rather than a man of war.

Mr. WEISL. Assuming, General Sarnoff, that the system or the change recommended by the Rockefeller panel making the chairman the chief military adviser cannot be implemented at the present time, would you recommend that the members of the Joint Chiefs of Staff be relieved of their operational command and stick only to their duty or duties as members of the Joint Chiefs mapping overall strategy for the United States?

General SARNOFF. On the assumption that the first, as you say, could not be implemented at this time, I would recommend the modification you have mentioned. I think that would be an improvement, but it would not go as far as I would like to see it go.

The reason for my favoring that change, even in modified form, is that I think it is incongruous to have in that position a man wearing two hats and having divided responsibilities and having the pressures of his own services upon him.

Mind you, if I may add a word, I should like to make it clear that having spent a good many years from time to time in the Pentagon, and having worked practically with all the men who have been members of the Joint Chiefs of Staff in one form or another, I neither make nor intend the slightest criticism of these men, who are great Americans and fine soldiers and dedicated people. I am addressing my observations to the system rather than to the individuals.

Mr. WEISL. I appreciate that, general, and your recommendation is particularly valuable because you represent a cross section of experience which no witness that appeared before this committee has had. You have been a soldier. You have advised the Department of Defense. You have worked under three Presidents. You are a successful industrialist. You are one of the leaders of research, both basic and applied, in this country. So that we really want your candid recommendations.

ADDITIONAL EXPENDITURE NOT AN UNDUE BURDEN

Now, I come back again, General Sarnoff, to the Rockefeller recommendation on expenditure, namely, \$3 billion, \$6 billion, \$9 billion, and so forth, over the present expenditures allocated. You are confident as a businessman, and from the evidence that was introduced by economists, bankers, industrialists, and other persons, that this will not create an undue economic burden on the United States?

General SARNOFF. It is my sincere belief that we could increase the expenditures necessary to strengthen our overall defense system without endangering our economic system. Now, one of the reasons that has led me to this conclusion is this: While a sizable increase in military expenditures will probably mean an increase in the public debt, and would thus require a more flexible debt ceiling, a modest rise in the public debt should not endanger our economy. The Federal debt is less of a burden on the economy at the present time than it was 10 years ago. Whereas the Federal debt has grown from approximately \$258 billion in 1946 to only \$274 billion or thereabouts in 1957, the gross national product, which supports the debt and on which it is a burden, mounted from \$200 billion at the end of World War II to \$439 billion in the third quarter of 1957.

In short, the ratio between the Federal debt and business activity as a whole is only 54 percent as high now as it was when World War II ended. Assuming even a \$43 billion military budget—and I am taking what I read in this morning's paper as a \$40 billion recommendation and adding this \$3 billion we have referred to—I say, assuming even a \$43 billion military budget, this figure would represent about 10 percent of our present gross national product. Compared with the recent past, this proportion could be described as normal under the present world situation.

The average ratio of defense to gross national product since fiscal 1953 has been 10 percent, and it is estimated that Russia is presently spending for defense 25 percent of her national income.

Mr. WEISL. In other words, you believe what the chairman and the other members of this committee have repeatedly stated; that we certainly can afford to spend as much to defend our freedom as the Russians are spending to destroy it?

General SARNOFF. I certainly do, and I think we cannot afford less than is necessary to defend our freedom. Of course, it is a question of how it is spent. I think economies can be effected that may not necessarily bring these figures to these high points.

LAG ON LEAD TIME

Mr. WEISL. General Sarnoff, one of the serious problems which has been testified to here by expert witnesses is the lag in lead time in developing weapons systems in the United States. It was pointed out that it takes us almost as long to make up our mind to create a weapons system as it does for the Russians to make up their mind and actually put a weapons system in operation. Could you give us some suggestion as to how we could cut this lead time down?

General SARNOFF. Well, sir, in my statement I indicated 1 or 2 suggestions. But, fundamentally, Mr. Chairman, I should like to make this observation; that, no matter what technical suggestions

anybody can make about how to improve lead time, it ultimately gets down to the man who makes the decisions.

Lead time is a product of decisions, and, in a developing technology that requires changes from time to time and that produces new knowledge as you go along, somebody must have the courage and the capacity to cut off the discussion, to cut off the argument and debate and say, "All right, boys; this is it. We go on from here."

Now, no system that you can set up that does not provide the type of man who has the knowledge and the capacity and the confidence in his own judgment to make that decision is going to improve lead time.

In addition, of course, it is the simplification of the Defense Department organization which is recommended by the Rockefeller report and which I have endorsed this morning—that, too, would help to cut down lead time. And, finally, I think that a great many details are insisted upon by the agencies that let the contracts which can be very well left to the contractor.

As I have indicated, changes and decisions could be made at a lower level, where the fundamental operation of the weapons or the system are not involved.

All these things combined, I think, would substantially cut down lead time, and I know of no reason why it should take us, with all the experience that we have had in the world of technology and science, a longer time to travel the path between conception and ultimate product than it takes the Russians, who have had far less experience in those fields than we have had.

TOO MANY AGENCIES

Mr. WEISL. It was pointed out in the testimony here, General, that there are too many agencies, too many people, and, as Senator Bush pointed out, layers and layers of committees and organizations and people with no responsibilities who have to pass upon ideas, who have to give their approval of suggestions, and that this is one of the reasons for our lag in lead time. Do you agree with that?

General SARNOFF. It is doubtless a contribution toward the delay.

Mr. WEISL. For instance, General, a committee recently appointed by the President of the United States, headed by Ben Fairless, formerly the president of the United States Steel Corp., only this year pointed out that, in order to get military assistance for 1 of our allies, we have to get the approval of 37 agencies, and, of those 37 agencies, a very small percentage have any responsibility in the matter. They merely are advisers or people who have to concur. And in that report to the President a chart appeared, which I hold here, showing the 37 agencies through which simple aid for military assistance to an ally has to pass. You agree that a situation like that is intolerable, do you not, General?

General SARNOFF. I do, and I think that it is quite possible to streamline it and to expedite those decisions.

Mr. WEISL. Witness after witness has testified that these same suggestions were made that we must streamline defense, but that nothing happens, that nothing is done. Have you any suggestion as to how we can accelerate, or compel, or bring about this streamlining?

General SARNOFF. Well, I do not know that I would go so far as to say that nothing has been done. I think that improvement has been achieved here and there, but not sufficient improvement at the decision-making level.

I think that the suggestions contained in the Rockefeller report and in the statement which I read earlier this morning for streamlining the Defense Department, for assigning authority and responsibility to a definite officer and giving him the power to implement his decisions, like funds, would go a long way toward meeting some of the problems to which you have properly referred.

Now, of course, we must recognize that the Defense Department business is the largest business in the world. I am not ready to say that, even in a large corporation, decisions are made as fast as in some cases they ought to be made, or that there is not some lag or that there is not some overlapping. But it is not quite as serious in a corporation or in a normal business as it is in the Defense Department, which deals with the life or death of our Nation, and, therefore, I think every effort should be made to accelerate decisions, to centralize authority, to avoid overlapping, and to speed up particularly the weapons that we need and those in which we are meeting the most serious competition.

SUBMARINES

Mr. WEISL. In your statement, General, you very properly pointed out that the missile-launching submarine is as dangerous a threat to the United States as the ballistic missile, and you pointed out that the Russians have approximately five times as many submarines as we have, and are building many times more submarines than we are.

Do you believe that some person should be put in charge of the submarine-building development of the United States?

General SARNOFF. I think there is a person in charge, as I understand it.

Mr. WEISL. Who is that?

General SARNOFF. Of the atomic submarine.

Mr. WEISL. Who is that?

General SARNOFF. Admiral Rickover, I think, has been centralizing that activity for the Navy, hasn't he?

Mr. WEISL. Well, we have been told in testimony that has been made public that Admiral Rickover has very little to do with the development of atomic submarines for launching missiles.

General SARNOFF. Well, if that is so, then I would make the same recommendation as to atomic submarines that I have made with respect to antimissile missiles.

I think that the atomic submarine is not only—that is I am speaking of an atomic submarine with a launching platform capable of releasing guided missiles, I regard that not only as dangerous as the ICBM but in some respects may be even more dangerous, and may come more quickly than the ICBM because there is no question that you can have an atomic submarine.

We have them. There is no reason to believe that the Russians do not already have them or if they do not have them now, that they won't have them soon.

There is general agreement that you can launch a missile from a submarine even when it is submerged. And we all know that the IRBM is in existence. Therefore, if a submerged atomic submarine is able to launch and release an IRBM missile even at a distance of, say, 500 miles from the coast, if they have enough of those submarines, and if they have enough of those missiles, why they could pose a very serious threat to our cities, particularly on the coastline, and even beyond, because that missile is not limited to 500 miles.

The IRBM already has a reported range of about 1,500 miles.

Now so far as I know, there is no adequate warning system in existence at the present time that could detect these submarines and intercept these missile-launching submarines.

I don't say that it is not possible or that it may not be possible to achieve a much greater measure of success in that field of warning than we have at the present time.

But as it stands today, the Russians could achieve a status in the submarine field perhaps even quicker than they could in the intercontinental ballistic missile field, and therefore I urge with the utmost earnestness that that problem be looked upon seriously, that it be concentrated under a single head, and that all speed be made toward meeting whatever it is possible to meet within the present knowledge.

TASK FORCE STRATEGIC PLANNING

Mr. WEISL. I failed to ask you, General Sarnoff, whether you agreed with the task force strategic planning that the Rockefeller panel recommended.

General SARNOFF. I do, sir. I agree with the unified command and the assignment of roles and missions on the basis outlined in that report.

Mr. WEISL. And you do believe, as was pointed out by that panel that the present system of separate Army, Navy, and Air Force strategy is obsolete, due to the advancement in weapons?

General SARNOFF. I do.

Mr. WEISL. I am sorry, my time for questioning is up and thank you.

Senator SALTONSTALL. Mr. Weisl, would you clarify what you meant when you said Joint Chiefs strategy or words to that effect?

You mean the missions of the various services?

Mr. WEISL. That is right; that is what I meant to say.

General SARNOFF. That is what I understood.

Senator JOHNSON (presiding). Are you through, counsel?

Mr. WEISL. Yes.

Senator JOHNSON. General Sarnoff, I am particularly concerned with two of your very thoughtful recommendations.

First I understand you recommend against an outside civilian controlled advance weapons research agency.

General SARNOFF. I do, sir, at the present time, on the theory that it won't speed up results just now.

REDUCING LEAD TIME

Senator JOHNSON. Now, second I note the urgent importance of reducing lead time between research and production of weapons.

I want to ask you this question :

Do you believe such reductions in lead time can be made without a separate agency outside of the Pentagon as has been recommended to this committee?

A great many statements have been made to the committee that one purpose this civilian agency would serve would be to cut down the lead time.

We have been told that the military has always had difficulty in developing its weapons and bringing them into existence and that we would do a much better job if we had an outside civilian agency.

General SARNOFF. I do not agree, Mr. Chairman, that that would be so for the following reasons.

The civilian agency, whatever it is, would have to coordinate and reach agreement with the military agency on the weapons.

After all, the user should have not only something but a good deal to say about what kind of a weapon he is going to use, and I think that whatever acceleration you might have at one end would be lost in the debate between the civilian agency and the military agencies in reaching agreement.

Furthermore, I think that if you relieve the Joint Chiefs of Staff of the respective military services from the dual responsibilities which they now have, and concentrate their efforts more or less on logistics, training, and manpower and so on as contemplated in the report, that there ought to be an acceleration there.

And finally, as I have indicated before, the assignment of special tasks to designated people within the Defense Department who should be given the authority with the responsibility to make decisions would all together, I think, accelerate the lead time.

Also there is a lot of redtape that can be cut out, a lot of decisions that can be left to the contractor without interfering with the fundamental operations of the weapons.

Senator JOHNSON. Now, as for my second question, General, it is almost as though you had anticipated me. You said lead time must be cut down. I should like for you to tell the committee, 1, 2, 3, 4, 5, what you would do to reduce this lead time. Specifically, what do you recommend? You say cut lead time. That is a pretty general expression. How are we going to cut this lead time?

General SARNOFF. Specifically, to answer your question, Mr. Chairman, at the risk of some repetition, because I have stated it before, on a 1-2-3 basis—

Senator JOHNSON. Let us see if we understand each other. I want you to summarize for the committee as briefly as you can the steps that you would recommend that we take in order to effectively reduce lead time.

General SARNOFF. Yes, sir. Well, now, the first step that I would take would be to assign the definite responsibility and authority in the field of missiles, antimissile missiles, submarines, satellites, these things we have been talking about.

Now, in each case there would be a person directly responsible for the results to be achieved in those fields. Once everybody knew who it was that had the power to make the final decision in that particular field, you would cut down a lot of the redtape and a lot of the running about needlessly, and a lot of the delay. So, I would say

the first answer is organizational. Set up the organization so that there is knowledge as to who the person is that has the authority and responsibility and the power to make the decision.

Second, give the contractor more latitude in making decisions when he is producing the weapons, where the decision does not involve the fundamental operation of the weapon or the system.

Third, the reorganization of the Defense Department, as recommended, which would give the present members of the Joint Chiefs of Staff relief from the individual pressures under which they are now, should speed up fundamental decisions at the very top as to what our strategy should be, and our weapons and our strategy are interrelated.

Once you decide what your strategy is, you then know what kind of weapons you need in order to carry out that strategy; so, there would be a saving of time there, avoidance of the delays which are now incident to the interservice differences, and I think that, perhaps, I should have put that first rather than third. But, in any event, it is a very fundamental requirement.

And, finally, I would say that no system that anybody can set up works by itself. We all need supervision, and, therefore, once the system is set up there should be a continuous followup, a continuous supervisory staff to see that the job is being done. And, if it isn't being done, if there is any undue delay, to raise the red flag and to call attention of the Secretary of Defense or the President or the Congress to delays, and not wait too long before that happens.

CONTROL OF OUTER SPACE

Senator JOHNSON. General, what importance do you attach to the obtaining of control of outer space in order to obtain world peace?

General SARNOFF. I attach very great importance to that, and, of course, I hope that the Russians may be impressed and accept the very excellent suggestions that the President has made in the letter which he sent to Mr. Bulganin yesterday, that outer space should be reserved for the purposes of peace.

But until and unless we are sure that everybody else has that point of view, we must proceed on the theory that we must get all the knowledge that we can of outer space. And I would certainly say that the sum total of our ignorance today is vastly greater than the sum total of our knowledge about outer space.

It is a new world, and we must recognize, Mr. Chairman—and this is a part explanation, I think, of some of the difficulties we face—we must recognize that what has happened in the last decade practically is that man has been catapulted from the very earth on which he has been standing right into outer space. And, while we thought we were standing on terra firma, the earth itself was moving right from under our feet.

Now, we are in new dimensions, new worlds, and the information that is to be gained from a greater knowledge of the behavior of natural forces in outer space may, and probably will, revolutionize most of our present-day knowledge, and with that revolution will come necessary changes in equipment to synchronize with the new fundamental knowledge secured.

Senator JOHNSON. General, your observations are most impressive, and I only wish we had time to go into the matter in greater detail. I will, at least, ask for the opportunity to explore it with you privately at some length.

NOT MEETING THE CHALLENGE

General, I have two brief questions I want to ask before I conclude. In your opinion, has American industrial capacity been mobilized to the fullest extent desirable, possible, and necessary to meet the challenge from Russia?

General SARNOFF. No; I don't think it has. I think it has the capability to meet whatever the requirements are.

Senator JOHNSON. But it has not as yet been mobilized?

General SARNOFF. It has not as yet been fully mobilized.

Senator JOHNSON. And do you think we have been derelict?

General SARNOFF. I beg your pardon, sir?

Senator JOHNSON. Do you think we have been derelict?

General SARNOFF. No; I wouldn't say that. I think our plans haven't been defined sufficiently, and before you can mobilize for action, you have got to crystallize your plan.

Senator JOHNSON. Then you do think we are doing enough soon enough?

General SARNOFF. I think we are doing more since this committee and others have started discussion of the problem we face. Are we doing enough? No; I don't believe we are doing enough to meet the requirements of the situation. I think we can and should do more.

Senator JOHNSON. And you have no doubt but that American industry has the capacity to do all that is needed?

General SARNOFF. I have no doubt whatever; not only American industry, but American science and American ingenuity. I have no fears about our not being able to catch up with the Russians wherever we may be behind, but that isn't good enough. I want them to be in a position to have to catch up with us.

But I think that the rate of progress in those fields today is faster in Russia than it is here. What we must do is increase the rate of our progress, or else the gap will widen rather than narrow.

Senator JOHNSON. I heartily concur in that observation General. Thank you. You have made a great contribution.

Senator Saltonstall.

Senator SALTONSTALL. Thank you, Mr. Chairman.

General, you are always a stimulating witness. May I ask you, in my brief time, several questions? I did not hear all of your testimony, because both Senator Johnson and I had another engagement which we had to keep. Did you read the testimony that Professor Livingston presented to this committee?

General SARNOFF. Yes, sir; I did.

COMPETITIVE INCENTIVES FOR RESEARCH AND DEVELOPMENT

Senator SALTONSTALL. Have you read, also, his article on that subject in, I think it is the Harvard Business Review?

General SARNOFF. No, sir; I don't think I did.

Senator SALTONSTALL. As I understand it, both in his testimony and in that article, what he suggested was—and this is a followup along the lines of what Senator Johnson said—to give industry more competitive incentives for research and for development of these articles.

As I get it, he felt it would be a better method for cutting down lead time to put what you wanted out into industry for research and allow them, perhaps, to compete one with another to a certain degree, with incentives, until the job was up to, perhaps, the development stage, at least, and possibly the production stage.

Now, as I understand it, too, you think, for the time being, that we should keep the control of it in the Defense Department?

General SARNOFF. Yes, sir. I believe that what may be called applied research, particularly, must be kept as close as possible to the user of the weapon or the system involved, and if you took it away, put it somewhere else, the attempt to achieve agreement between the user and the researcher would itself cause a very great delay.

I don't think that that is true with respect to basic research. I see no reason why that can't go on, because that is a search for the unknown, rather than the known, and, when we discuss lead time, really, we have more or less the problem of delay from the time that we make up our mind that we want a certain weapon until we get it done.

The delay is not at the beginning. The delay is when you have made up your mind that you want a certain weapon, and then you get all sorts of ideas as to what you should have, and so on. Now, it is at that point that lead time can be cut down considerably, but not by an outside research agency at this stage.

Senator SALTONSTALL. You have a great deal of experience in the Pentagon and with the armed services in one way or another. You were on this committee for—

General SARNOFF. Reorganization.

Senator SALTONSTALL. You don't think that the leaders of research in uniform are too cut and dried, their minds are not open enough to new ideas, and so on? We hear that said, sometimes, about them.

General SARNOFF. Well, I think that there may be instances here and there, but, by and large, particularly during recent years, I think that such difficulties as have come to public notice have been in some instances where some military men were far ahead and wanted to go still faster. Also, I think that whoever did the job on the outside would still have to convince the military that it was applicable to their needs and to their use.

BASIC AND APPLIED RESEARCH

But I make a sharp distinction in my statement, Senator, between basic research and applied research.

Senator SALTONSTALL. Yes; I understand.

General SARNOFF. What I am saying now applies mostly to applied research.

Senator SALTONSTALL. Applied research.

General SARNOFF. I would put no restrictions on basic research. Anybody may be able to give an idea on that.

Senator SALTONSTALL. I think we are all agreed on that. And, for the reporter, there is the article I referred to, Decision Making in

Weapons Development, in the January-February 1958 issue of *Harvard Business Review*, by J. Sterling Livingston.

Now, one question asked by Senator Johnson as to whether industry was fully mobilized. You say not enough yet, but certainly you would not undertake at the present time to mobilize industry to the degree that we would have to put controls on our other production, would you?

General SARNOFF. No, sir; I don't think that it is necessary at the present time.

Senator SALTONSTALL. I was out, General Sarnoff, and I am not sure whether you went into any detail or not, but, as I understand it, you broke down the Rockefeller report in the increased expenditures recommended for 1959, 1960, and 1961, did you not?

General SARNOFF. I presented here a statement which I received from them with the qualification that I, personally, did not participate in the preparation of this statement, but I did break it down to show how the \$3 billion is made up.

Senator SALTONSTALL. The overall is \$3 billion in 1959, \$6 billion in 1960, and \$9 billion in 1961, in round figures. Now, my question is this: When you begin to get up to additional expenditures of \$3 billion, \$6 billion, and \$9 billion—the President has recommended \$3 billion this year, but when you get up to the \$6 billion and the \$9 billion class—do you think it is possible to cut down other expenditures of the military to offset some of that increase in these particular objectives?

General SARNOFF. I should think so. I think that greater efficiency is always obtainable in any organization, and particularly one as large as this. I think that these figures proposed by the Rockefeller Committee were based on the idea of what additional work has to be done in certain fields, but did not attempt to set the overall budget.

Senator SALTONSTALL. So that, if we begin to increase in those fields as far as the \$9 billion estimated, assuming these missiles come into production to that degree, certainly, we ought to be able to cut down in some of the other fields since we will rely on these missiles in the particular field where they can defend us.

General SARNOFF. I should think so, but only after we are satisfied that they are operational and effective and dependable, but until then we have to carry on with what we have.

Senator SALTONSTALL. Just one other question. You said, and quite rightly, there should be 1 man in charge, we will say, of submarines, and 1 man in charge of satellites and missiles, and so on. That type of organization is now in effect in the military to a great degree. Take submarines, for instance. We have the Chief of the Bureau of Ships. Now, he is the one man responsible.

Admiral Rickover, of course, works under him. Certainly, if we were going to put one man in charge of submarines, another man in charge of cruisers, another man in charge of destroyers, we will say, to use the Navy as an example; that would cut down the effectiveness, so it seems to me, of the Navy procurement organization more than it would help it. You did not mean to go to that extent, did you?

General SARNOFF. I did not mean to go to that extent. I selected only the items that I regard as urgent, and I think there should be a distinction between what is urgent and what is important. Now, with

the urgent things, like atomic submarines with guided-missile platforms, satellites, missiles, and antimissile missiles, I think that those are urgent enough to call for maximum concentration in parallel rather than in series.

That is the concentration of going on simultaneously on all those fronts and that is too much for one man.

It may be all right if he is high enough on the top to merely deal with overall policies, but for the day-to-day workload, for the decisions, for the changes and so on there must be one man responsible.

He must have the authority, and the power to make decisions, and the Secretary of Defense must know whom to hold responsible for results.

Senator SALTONSTALL. I agree with you entirely and that man has got to pick lieutenants underneath him to do the job and hold them responsible in their respective fields.

General SARNOFF. That is right.

I don't want too many subdivisions at the top. I want them a little lower down. But—

Senator SALTONSTALL. That is why the RCA is a successful corporation. [Laughter.]

General SARNOFF. Well, I hope that may be one contribution.

Senator SALTONSTALL. Thank you, Mr. Chairman, and thank you, General.

General SARNOFF. Thank you.

Senator JOHNSON. Senator Kefauver.

Senator KEFAUVER. Thank you, Mr. Chairman.

EDUCATION

General Sarnoff, I was interested and pleased with the emphasis and importance you gave education.

Beginning on page 8 of your prepared statement, and on page 9 you rerecommended the establishment of a national education reserve to allow scientists in industry to take off some time to teach in high schools here and there.

Will you amplify on that proposal?

Has it met with acceptance in industry?

Is it practical?

General SARNOFF. Well, of course I believe it is practical, Senator. I believed this when I made the recommendation.

The reception it has had has been one of great applause and no activity, which often happens to new ideas.

This is an idea which, if it has any value, can only be motivated by a Government impulse, and the Government has got to start it.

And when I speak of a reserve, that would have to be a Government setup.

Senator KEFAUVER. Yes, sir. But what part would the Government play in it? How do you—

General SARNOFF. Well, I would visualize a bill that would set up a national educational reserve, as you have a military reserve, for example.

You would invite or enable teachers or engineers, physicists or scien-

tists in industry, to sign up for this reserve, and agree to give certain services in their communities.

They would receive a diploma or they would receive a certificate indicating they were enrolled in a national service.

Now industry itself would be called upon to supply these men in their engineering and research departments, a reasonable number from each company, to the local high schools in particular where the bottleneck exists at the present time.

We all agree, I think, that the teaching of science must begin at the elementary and high school levels, that there is not only an inadequacy of teachers at these levels but there is a lack of qualification on the part of some of these teachers in the field of science which has been more or less neglected.

If you bring a man from let's say our engineering department or research department into a local high school, and he fits into the curriculum that is laid down of course by the educators, he brings a new interest, a new inspiration, a new excitement into the classroom for the youngsters. He is able at once to perform that job, whereas for us to begin to train science teachers—which we ought to do simultaneously—is a job of 3 or 4 or 5 years before they can qualify.

So here, too, I am dividing between the urgent, which is to meet the requirements of today, and the important, which is to develop talent for meeting the requirements of tomorrow.

Now, I don't think we need so many. I think some companies in industry itself would be able to give 15 or 25 or 50 of their men for 1 year who could meet the local requirements.

Also a good many of their people would be willing to give their services in the evening, teach in the evening schools.

I think some of them would regard it as a privilege, if it were made clear that this was a service rendered for our national security, to meet an emergency.

I think the corporations could afford to make that contribution, not only because anything that is good for the country is good for them, but also because the corporations themselves have been exhausting some of these graduates from colleges, taking them into industrial operations.

This would be one way for industry to help replenish that supply.

Senator KEFAUVER. General Sarnoff, is it your thought that these teachers furnished by industry would be on a part-time basis, or just what would your idea be about that?

General SARNOFF. My idea about that would be that there would be some that would have to give their full time to teaching, in, say, during the regular day hours in the school.

As to those, my idea would be that the corporation would release them, pay them their full salary, give them this more or less sabbatical year but they give their exclusive time to the teaching business.

Secondly, there may be those who are employed regularly in the daytime who would be willing to teach in addition in the evenings, on a voluntary basis, where no question of pay was involved.

Senator KEFAUVER. Of course, this plan might not help students in high schools where there are no factories located—like in my hometown. They never had a factory there. What would you do about them?

General SARNOFF. You mean because you wouldn't have the men from the corporations?

Senator KEFAUVER. Yes; that is right.

General SARNOFF. I think you could get a few fellows who would like to visit your State for a year or so.

Senator KEFAUVER. You would be willing to send them down to a small town in Tennessee?

General SARNOFF. I think you would have it from various places.

Senator KEFAUVER. It is a very interesting proposal. Incidentally, Mr. Chairman, along that line, I was down at Oak Ridge about 6 weeks ago, and they were going to work out a similar plan to have employees and scientists at Oak Ridge spend an hour or 2 hours a week teaching in the high school. They were doubtful as to whether it was legal for them to take time off to teach 2 or 3 hours a week. And you would certainly feel that Government scientists employed at Oak Ridge and Los Alamos and other places ought to be able to do a little teaching once in a while, would you not, General Sarnoff?

General SARNOFF. Yes, sir.

Senator KEFAUVER. All this program would require would be some implementation, as you say, by governmental direction, and there would be some system set up where demands could be considered and where the employees could be dispersed to this place or that.

General SARNOFF. My specific recommendations, Senator, would be that, if this suggestion has any appeal to this committee, the problem be submitted either to the Department of Health, Education, and Welfare or to the Science Foundation, and ask them to develop a concrete program.

Senator KEFAUVER. I am sure your proposal, which was brought out 2 years ago, has been considered by Health, Education, and Welfare and other agencies. Can you give us anything of the reaction you got?

General SARNOFF. Well, generally speaking, the reaction has been favorable, but what has been lacking is a starter here. There have been some doubts expressed about it, some criticisms. I think in some cases there was fear this might interfere with regular teachers and the teachers' profession. I have no such fears myself. You would have to have these men licensed by the individual States, because the local laws require licensed teachers. But the objections have been more or less technical and detailed. There have been no fundamental objections.

Mr. Chairman, if I may repeat, I want to be sure that I didn't make any slip in the statement when I said that I thought that what is good for our country is good for our corporations. I don't want to have that slipped in reverse by mistake. [Laughter.]

Senator KEFAUVER. General Sarnoff, one further question. I think your plan has a lot of merit and does not result in anything except special lectures by highly skilled and well-known men. But I hope, also, that you would consider having citizens' meetings and having the corporations furnish unusually well-qualified scientific lecturers to generate interest among our laymen outside of the schools, also.

General SARNOFF. Yes, sir. Television is one of the other things I had suggested.

Senator KEFAUVER. Thank you very much.

I have taken up too much time.

Senator JOHNSON. Thank you, Senator Kefauver.

Senator Bridges.

Senator Flanders.

Senator FLANDERS. Mr. Sarnoff, while I was not here when you were presenting your testimony, I have in front of me these recommendations which, I presume, you are prepared to be questioned on.

General SARNOFF. Yes, sir.

Senator FLANDERS. On page 4 occurs this paragraph:

I recommend that the Army, Navy, and Air Force continue their own research and development organizations in order to advance solutions of their special problems. As weapons become more complex, it is important that military people develop the operational concept, logistic support, and personnel simultaneously with the development of the weapons.

I think that last sentence, about developing the logistic support and personnel simultaneously, is a very important thing, and it fits in with the principles which Professor Livingston discussed of not waiting until you finished one element of your development before you began the next. So that there is no question in my mind about that.

But when we speak about having the Army, Navy, and Air Force continue their own research and development organizations, we come into some little complexities, I believe. For instance, if we take the case of the IRBM, there are two organizations in charge of its development: One, the engineering development organization known as Ramo-Wooldridge, set up by General Schriever. And the other, the organization which Dr. von Braun brought over here, practically intact, from Germany.

Now, there we have 2 organizations; 1 in the Air Force and 1 in the Army, both doing what you urge here; that is, continuing their own research and development organizations. Yet it does not seem to have worked out too well. At least so far as organization is concerned, I am not sure but that, up to this point, perhaps, competition has been a good thing in getting different approaches going. However, organizationally, it is something of a problem. How would you relate this problem to your recommendation that the separate forces continue their own research and development organization?

General SARNOFF. Senator, you have put your finger on a very important aspect of this whole question. My answer is, first, a certain amount of competition in research, as in everything else in life, is desirable, provided that competition does not prevent ultimate completion of the effort or delay it beyond its usefulness.

The way I would meet that situation is the way, it seems to me, that has been proposed. First of all, the recommendation that I have made in that statement is that there be one Assistant Secretary or Under Secretary or whatever his proper title might be, in charge of research and development. He should report directly to the Secretary of Defense.

Under the proposed setup, the Army and the Navy and the Air Force would continue to do their own research and development for their specific services. But it would be the function of this Under Secretary to coordinate their activities and to see that there was no unnecessary overlapping and to expedite the results. Therefore, if he came to the example you have cited, and after studying it and analyzing it and getting the advice from his staff and experts, he came to the

conclusion that that competitive effort has gone as far as it should, that there should be a cutoff now, and that it should be translated into operational weapons, he either should have the power himself to make that decision, or if it is too vital, the Secretary of Defense, to whom he reports directly, should make that decision.

Now, at that point the Joint Chiefs of Staff, who today are equal with the Chairman of the Joint Chiefs of Staff—in fact, superior, because he has no vote—they would not be making that final decision. The final decision would be made by the Secretary of Defense through his assistant.

Assuming the right men and the right competence, it ought to work.

Senator FLANDERS. However, you are suggesting that a certain part of the program, on page 7, be done directly by a separate organization not under the services. You suggest that that be done with the anti-missile missiles and with the satellites?

General SARNOFF. Yes, sir.

Senator FLANDERS. Now certainly they both have important military significance, but why do you suggest taking those two particular ones and putting them in separate compartments instead of having them done under the services?

General SARNOFF. The reason that I so recommend, Senator, is that first of all neither of those two things actually exist. I mean an antimissile missile is a new development. And because of its urgency and vital importance, I want concentrated effort on that not mixed up with anything else that has to be operational. That is the first reason: greater concentration would result in quicker results.

Secondly, even as to that, as we go along, if it should prove, for example, that the antimissile missile and the satellite work are so close together that they overlap or that the same organization could do both, I would have no objection, in principle, to the consolidation of those efforts under a single head.

But starting out today, I think you would get quicker results, better understanding, by individually concentrating the responsibility.

Senator FLANDERS. Both the Army and the Air Force have satellite programs in mind, and the Navy has not. Now, that is the maximum of complication, is it not?

General SARNOFF. Well, except that under my proposal, neither the Army nor the Navy would be doing that job. It would be done by the person selected to head up the satellite or the antimissile missile, who is reporting directly to the Secretary of Defense, but who has to coordinate his efforts with the services.

Senator FLANDERS. He would draw upon the experience and the ideas and the developments of the other three services?

General SARNOFF. Certainly, and the facilities.

Senator FLANDERS. Yes, in making his recommendations.

Now, one of the factors in this IRBM situation is that based on the experience with the V-2 in Germany, Dr. von Braun from the very start abandoned the idea of fixed bases and made a completely mobile unit and a mobile operation. Whereas the Air Force made its development from concrete bases, movable but not mobile. Anything is movable, ultimately that has been made somewhere and put somewhere else.

There between the services you get into something more than just an engineering development. You get into a difference of approach to a military problem. Would you leave that with your Assistant Secretary?

General SARNOFF. Well, sir, I think that the problem you mention goes beyond the weapons. That really gets into military strategy, and that is the function of the Joint Chiefs of Staff. I think where a question such as you have indicated, whether a guided missile should be mobile or whether it should be stationary—

Senator FLANDERS. The question is there; it is not an imaginary one.

General SARNOFF. The men on the top have got to do the job first. They have got to make a decision as to which one they want, or maybe they want both. But I think it is a decision of such major import that the Joint Chiefs of Staff should make that decision, and then the people down below have to carry it out.

Senator FLANDERS. Thank you, Mr. Sarnoff. My time is up.

Senator JOHNSON. Senator Stennis. Senator Stennis is the distinguished vice chairman of this committee. Senator Stennis, I must go to the floor. Would you object to asking your questions from the chairman's chair?

If it is agreeable with the committee, I will ask consent that the committee sit during the session of the Senate today. We hope to conclude with General Sarnoff this morning.

We will have a brief morning hour for insertions in the Record, but we anticipate no legislative business.

Senator BUSH.

Senator BUSH. What time will the committee reassemble this afternoon?

Senator JOHNSON. Two-thirty. We would like to run until we have concluded with General Sarnoff this morning, which we estimate at 12:30.

Without objection, I will make that request.

Thank you, Senator Stennis.

Senator STENNIS (presiding). General Sarnoff, I think you have much more in your statement here than first appears. I came in a few minutes late and had to catch up with you. I am not going to burden the record anew with a lot of repetition, but there are a few things you mentioned here that I want you to elaborate on.

You mentioned one thing, the latest teaching aids. You say we must employ the latest teaching aids. You mentioned television, I believe. That is included in one of those. Do you have any others in mind?

General SARNOFF. Films.

Senator STENNIS. I beg your pardon?

General SARNOFF. Film, motion-picture films.

Senator STENNIS. And you think that they are particularly adaptable, television and films are particularly adaptable to teaching these subjects?

General SARNOFF. Well, sir, they can be particularly adapted by selecting competent, interesting, and exciting lectures and teachers.

Senator STENNIS. So far as you know, have we gone as far as we could or should in using these new aids?

General SARNOFF. No, sir, I do not think we have gone as far, but I would not be critical about it.

Senator STENNIS. I understand.

General SARNOFF. Because it is practically a new development.

Senator STENNIS. It is a new development, but you think it holds tremendous possibilities, I will say, as a new teaching aid; is that correct?

General SARNOFF. Yes, sir; I do.

Senator STENNIS. I certainly heartily agree with you and hope that it will be explored, developed first by our professional brethren in the great teaching profession and with such assistance as might be needed.

Let me mention another thing. You and others mentioned so much about the chief military adviser or the chief military officer of the Nation. It seems to me that, as a practical matter, there is not too much the Congress can do in passing a law as to what officer or what individual would be the chief military adviser in the Nation. The Constitution of the United States makes the President of the United States, happily, the Commander in Chief.

Regardless of what law Congress might pass in setting up an office, does it not depend, after all, upon whom the President of the United States selects to be his chief military adviser?

General SARNOFF. Yes, sir.

Senator STENNIS. That command is going to have the principal say on these military matters.

General SARNOFF. Yes, sir; it does, as a practical matter. But I would like to point out, if I may, that at the present time I think the chairman of the Joint Chiefs of Staff has no vote.

Senator STENNIS. Yes.

General SARNOFF. And, secondly, the present law, under the unification plan, defines the roles and missions.

Senator STENNIS. Yes.

General SARNOFF. And I am recommending that that be changed.

Senator STENNIS. I get that point, but there is so much being said, and I think it is misunderstood by the public, in part, about the creation of the office of the principal military officer for the Nation. And my point is that, whatever might be done, it is not controlling under any law that Congress would pass. The power is in the President, and how much confidence or how much weight he may give to whom-ever he chooses as his chief military adviser. Does it not come to that, as a practical matter?

General SARNOFF. As a practical matter, it does, and that is the way it should be.

Senator STENNIS. Yes. I heartily approve of that situation. So, after all, not referring to the present President or the present Chief of Staff, the chairman of the Joint Chiefs, I think it depends, whoever is in that Office, his power depends not so much on whether he has the vote or not, but depends on how far the President who has appointed him is going to follow his advice.

General SARNOFF. Senator, I go along with your philosophy.

Senator STENNIS. You do not have to. Disagree with it. I am trying to get an idea from you.

General SARNOFF. I go along with your philosophy, if I may say so, part way, but I think there is another aspect to it, and that is that, under the present setup, whomever the President may select as the chairman of the Joint Chiefs of Staff, and however competent and excellent he may be, it still remains a fact that he has got to get the other Chief of Staff, Joint Chiefs of Staff, to come to some kind of agreement on something, or at least to define the area of disagreement before he can make any recommendations to the Secretary of Defense or to the President. Now, under the proposed arrangement, he is the boss. Of course, he will listen to them; he will get their advice, but he will finally make the decision of what the recommendations should be.

Senator STENNIS. That is a very good point, and I am glad to get the benefit of your specific reasons. Now, without arguing that point any further, we say so often that we could go further without endangering our economy, and you make that statement this morning. Now, what changes in our economy do you think are necessary to add this push that is necessary in the military field? You mentioned the Rockefeller figures, increasing \$3 billion per year and then \$3 billion more additional next year, and so on. What changes in the economy? You mentioned it might be necessary to increase the public debt. Would you recommend that as a way of financing these additional billions?

General SARNOFF. Well, I do not recommend, and did not intend to recommend, any changes in our economy. I did mention, I believe, that it might be necessary to raise our present debt limit modestly and that, if it was found necessary to do that, I did not think that that would endanger our economy. I had hoped that we could avoid it.

Senator STENNIS. Well, I did not mean so much change in the economy. There has got to be some change in the economic side of this picture if more money is required. Now, you did not mean to recommend an increase in the debt as the way to finance these additional billions. If they are necessary, why, then, you think it would be better to increase taxes, if necessary to finance them, rather than to increase the debt?

General SARNOFF. I think, if it is necessary to increase it, the only two ways that are available are increased debt and increased taxes. Before deciding which of those I would recommend, I would want to have more information than I have at this moment as to the amounts involved and so on.

Senator STENNIS. And decide which was necessary. But I think the American people ought to be told at the same time they are told that we must go further and that all this can be done within sound economic principles. I think they ought to have pointed out to them what some of these steps are that are necessary from the economic angle.

In other words, we say more guns and less butter. We all agree we ought to have more guns, it seems. Now, where is the less butter coming in, and what constitutes the less butter?

General SARNOFF. As I tried to indicate in my statement, Senator, I thought that, if it were necessary to abandon certain of our luxuries in order to maintain our freedom and to assure our national security, I would go that far, too, not only increased taxes and

increased debt, but to make sacrifices which I believe the American people would make if they understood all of the facts.

Senator STENNIS. I am sure they would be prepared to make them if they understood them. I only want to get your recommendations.

General SARNOFF. My recommendations are to go as far as necessary in order to assure our survival. Now, when it comes to spending this money, I am interested in seeing that we get a dollar value for a dollar spent.

Senator STENNIS. Of course, and, as I have indicated before, I think there is plenty of opportunity to effect economies and increase efficiency. There always is. But it is up to us to determine—I mean those of us who have our share in the administration and the Congress—to determine what is necessary.

General SARNOFF. That is right.

Senator STENNIS. And then you think it is our duty to impose whatever is necessary as a part of the program of increased military expenditures; is that correct?

General SARNOFF. I do. That is my view.

SHORTAGE OF SCIENTISTS

Senator STENNIS. Let me ask you one specific question now about this shortage of scientists. You are a great industrialist, and I mean every word of that, but is industry today actually impeded by shortages of scientists and technicians, or do you speak merely of the future problems?

General SARNOFF. Well, there was, I think, a greater shortage a year or two ago than there is at this moment. I have no doubt that, as the defense effort is increased along the lines we have been discussing, there will be greater need for more engineers and scientists. But I would not say that at this moment our overall result was due to a lack of scientists. I think it is rather due to a lack of something else.

Senator STENNIS. Well, what else is there?

General SARNOFF. Well, first, a failure to assess the urgency of the situation, and to evaluate the requirements along the lines that we have been discussing and recommending here before this committee, and as the President himself has indicated to the Congress in his last message on the state of the Union.

Senator STENNIS. You mean this development as to missiles and satellites and space programs?

General SARNOFF. That is right; and, also atomic submarines and so on.

Senator STENNIS. That it was not due to a lack of scientists and technicians, but a lack of application?

General SARNOFF. That is right.

Senator STENNIS. Is that correct? Now, specifically, in the spring of 1957, in June or July of 1957, was your company or any other of the great industrial companies, so far as you know, did they actually suffer for the lack of scientists and technicians? You said you had a new crop coming in from the colleges that year, and you had been getting them in previous years, the same as from other schools. Have

you felt a real slowdown or slackening of effort, or an acute shortage, or any shortage?

General SARNOFF. Well, speaking for my own company only, I can say we anticipated that result and we had a large training course of our own. We took youngsters from the colleges.

Senator STENNIS. Very good.

General SARNOFF. Not only after they graduated, but to follow them up during their senior years. Also, we had some scholarships that we had awarded.

Now, that, plus our own training courses, was sufficient to enable us to meet the requirements of the situation. They, perhaps, were not as heavy upon us as they were upon other companies, but, to the degree that we received orders for research and development and production, we were able to meet those requirements on schedule.

Senator STENNIS. Generally, if I may ask that question, have other industries been able to meet their requirements?

General SARNOFF. Generally speaking, Mr. Chairman, they have. But my apprehension, and, I assume, theirs, is not so much what happened yesterday or today, but the need for this new crop for tomorrow.

Senator STENNIS. It is the long-range feature you are talking about?

General SARNOFF. That is right.

Senator STENNIS. Thank you very much.

I believe the next one is Mrs. Smith.

Senator SMITH. I have no questions.

Senator STENNIS. Senator Bush.

Senator BUSH. Mr. Chairman, I would like to join with others in complimenting General Sarnoff on his very helpful contribution this morning, not only on his splendid statement here, but, also, on his very clear answers to a lot of these very difficult questions.

Before I develop my own questions here, I wanted to say to the chairman I was very much interested in his questioning about scientists, and I would like to pursue it just one step further and ask you, General, do you not think we have a deficit in our elementary and secondary school educational system so far as the teaching of science is concerned?

General SARNOFF. Very definitely, sir; we have.

Senator BUSH. And that, you consider a very important matter?

General SARNOFF. I consider that, really, in a sense, the bottleneck, because we have got to start from there before we can train for the future.

Senator BUSH. So, despite the fact you have not had trouble in years gone by in getting scientists into your company and, perhaps, other large companies have not had too much trouble at times, the fact is that you agree with Dr. Teller and Dr. Vannevar Bush that in our educational system we are really not teaching science at the levels where it should be taught, and even where to the extent, where it is taught in the elementary- and high-school level there appears to be a real deficit in the quality of teaching and the equipment for teaching the sciences. Do you agree with that, sir?

General SARNOFF. I fully agree with that statement; yes, sir.

Senator BUSH. Now, General, I wanted to ask you if you are familiar with the so-called Cordiner report?

General SARNOFF. In general, I am familiar with it; yes, sir.

Senator BUSH. Do you have any comment that you care to make about that report for the record?

General SARNOFF. I am in favor of the principle of the Cordiner report; namely, that our men in the military services should be paid reasonably and adequately to meet the rising costs of living and so on, and to meet, so far as it is possible to do so, some of the competitive elements of the situation.

Senator BUSH. Yes. This report calls for a very highly selective pay raise?

General SARNOFF. Yes, sir.

Senator BUSH. For scientists and technicians, particularly, where it takes a long time to train them and where the need for keeping them in the service is very, very great.

General SARNOFF. It is a selective process.

Senator BUSH. Do you agree with it?

General SARNOFF. I don't believe it is entirely a matter of increasing our costs; it is also a matter of decreasing our costs, because, if you have to lose these men and you have to train new ones over and over again, you lose on many fronts.

Senator BUSH. One of our problems with the expanded spending program is where we get the money and if there is any reliability in the estimate that if the Cordiner report were fully implemented in the course of a very short time it would save us an amount of \$5 billion a year, that would suggest a very desirable place to find some of the money, don't you think?

General SARNOFF. Well, I am not prepared to speak with knowledge about the number of billions it could save but I am in favor of the principle, and I should think that the net result of reducing the turnover of your scientists and able men, other able men, the net result ought to be the direction of economy rather than higher expenditure.

Senator BUSH. General, I am not asking you to endorse the \$5 billion figure, I assure you, although I venture to hope there may be some validity to it.

But, General, going back to the question of reorganization of the Defense Department, that is one which interests me very much indeed, and I am delighted with your comments on it this morning and of course with the Rockefeller report on this subject.

I think that this is as important as anything that has come out of these hearings, the testimony we are getting of the need of reorganization and for a unified command setup of some kind.

But little has been said in that connection about economies that may be derived in the way of money.

We talk about saving lead time, and improved efficiency and so forth, but I have not seen any testimony yet, even in the Rockefeller Brothers report, or in your statement or from other witnesses who have been before us, where anybody has tried to estimate the amount of actual savings we might make by a simplification of the Defense Department structure which is said to provide greater efficiency, save time and so forth and so on.

Would you care to make any comment about the actual dollars involved in this situation?

Do you think that it would be possible to have a lot of money by these improved methods and by increasing the efficiency?

I would like to hear your views on that.

General SARNOFF. Well, Senator, I have not seen any statement on that either and I don't know that I am competent to express my views in terms of specific dollars.

I would offer the observation that any improvement in efficiency automatically improves the economy.

Just how much, I think would be wholly speculative at this juncture because one would have to know how far the streamlining would go, what they would do, what they would eliminate.

But I would like to add to that observation the other one, that while we are all for economy and all for efficiency the basic reason for the recommendations of streamlining and altering the present setup of the Defense Department was not economy by itself, but it was to achieve the results which we feel are necessary to meet the military threats of potential enemies.

That is the basic problem we seek to solve.

Senator BUSH. Yes, sir; I quite appreciate that and I certainly concur that that should be the basic reason for considering it.

You will have to agree, I am sure though, that if we can economize as a result of improving efficiency through unification, that that is a very desirable byproduct.

General SARNOFF. Oh, not only desirable, Senator.

I agree with you entirely that it is essential to maintain our economy. And I think that very substantial savings can be effected.

For example, if you eliminate the duplication, if instead of building 2 things because you cannot get an agreement on 1, you may be able to save hundreds of millions of dollars, sir.

Senator BUSH. That is right.

Mr. Chairman, I thank the general. That is all I have to ask him.

Senator STENNIS. I thank Senator Bush and I appreciate his comments especially on this educational training.

Mr. Weisl, do you have something further?

Mr. WEISL. Yes, sir; I have 1 or 2 questions.

General, in discussing the question of raising the debt if necessary to meet added expenditures for defense, I think that you pointed out that the size of the debt is not the sole test, but the relation of the debt to the national product.

General SARNOFF. That is right.

Mr. WEISL. And you pointed out I believe, that today's debt, as large as it is, is only 54 percent as large in relation to the national product as it was 10 years ago.

General SARNOFF. That is right. It is far less than it was 10 years ago.

Mr. WEISL. Far less than it was 10 years ago?

General SARNOFF. As a percentage.

Mr. WEISL. General, we are very much interested in this question of where basic research and advanced weaponry should be vested, where the responsibility should be vested, and we have had many recommendations.

Now, Dr. Ellis Johnson was a member of the Rockefeller panel, was he not?

General SARNOFF. Yes, sir.

Mr. WEISL. And he is the head or director of the Operations Research Office of Johns Hopkins University; is he not?

General SARNOFF. That is my understanding.

Mr. WEISL. And the operations research office is under contract to the United States Army in the development of research for the Army.

May I read to you what he said yesterday about this problem of research and about the question of whether the military should choose the weapons. He said, and I quote:

Our weapons systems are selected under short-range crash programs which would lead to long-range disaster. Weapons are chosen not by professional scientists but by military men who have no background in research and development and whose tour of duty, an average of 18 months, is too short for them to become acquainted with the problems and the needs.

Do you agree with that statement?

General SARNOFF. I think some of its implications would go beyond the statement that I would subscribe to. But I have tried to draw a sharp distinction between applied research and basic research. And on the last, it seems to me, first, that under the proposals we have recommended, the Secretary of Defense would himself have funds and authority to carry on basic research by assigning it wherever he wants to assign it.

Also, the National Science Foundation would be given funds with which to direct the projects of basic research. It is one thing to conceive of the need for it, to see that somebody does it. It is quite another to actually do it. So, I do not think that you can place basic research in any basket and leave it anyplace.

Basic research is a reflection of our intelligence, our intellect, and our ingenuity, and it is not the monopoly of any 1 man, or 1 organization, or 1 country.

There are certain organizations competent to undertake basic or creative research, and, within the means allotted for such work, it should be the function of the Secretary of Defense and his staff and the National Science Foundation to see that it is carried forward on a reasonable scale.

Now, when you come to determining what weapons to use, you get into the question of strategy and missions, and I don't know any better way than to leave that to the military experts and the Chairman of the Joint Chiefs of Staff, the Secretary of Defense, and the President of the United States.

Mr. WEISL. The point is made though, General, that the military staff is concerned, and very properly concerned, with the immediate use of weapons, because they have got to look toward fighting a war tomorrow or next month or next year, and they do not have the time or the ability to be imaginative and choose future weapons. Therefore, the suggestion was made to us by many witnesses that future weaponry should be in the hands of a separate agency that would do basic research, develop the weapons, and then present them to the military as the development takes place.

General SARNOFF. I can understand the appeal and the simplicity of that suggestion, and the good faith with which others have made

it here. But in any effort to translate that into a practical reality, you meet with real difficulties.

New weapons are not the result of something that comes like a bolt from heaven or something that comes like Minerva from Jupiter's forehead. It's a practical development which you learn as you go along.

For instance, you are engaged in the business of making a missile. Well, now, somebody might say we will have a new type of missile. But he really couldn't translate it into a proto-type and develop it unless he knew all the experience of the missiles in being now or in process of production now. So, you have to have both.

Another fellow might say you don't need any missile at all; you will have a ray that will do that job, or something like that.

Well, that becomes basic research. So that I think that basic research has to be divided in effort, both inside the Defense Department, outside of it, National Science Foundation, all the industries themselves involved in science, the colleges and universities. It is limitless. But there has to be a coordinator at some point.

Mr. WEISL. Dr. Johnson further points out that the rate of invention today is so rapid that weapons tend to be obsolete by the time they come off the production line.

General SARNOFF. I certainly agree with that, and I am afraid that anything we know today or anything that we are satisfied is good enough today, 5 years from now will probably be obsolete, certainly 10 years from now. And if we get any real information on outer space, why we might find that everything is obsolete that we have got.

Mr. WEISL. I think that is all the questions I have, Mr. Chairman.

Senator STENNIS. Thank you, Counsel.

General Sarnoff, one more matter about this education program. I personally am not enthused so much to the idea of scholarships for the students. I believe the closer problem there is with reference to teachers, adequate teachers, and the encouragement, it seems to me, should come to that great profession rather than to the student, right now. What do you think of that?

General SARNOFF. I absolutely agree with you on that. You will have no better students, in the long run, than you have good teachers.

Senator STENNIS. Yes, and, even though it is a great profession and I consider it second only to the ministry itself, it is a dedicated group, and we owe them so much, at the same time their compensation is wholly inadequate, I think, and there is no recognition given in tax matters to their additional and special training. And the great deficiency, therefore, is the neglect of that profession, I think, and that it must first be built up.

I am very heartened to know that that is your opinion and that you think that is a sound conclusion.

General SARNOFF. I agree, sir, that neither the compensation nor recognition of the teaching profession is adequate at present, and I think that those deficiencies should be corrected, but I think that this is a matter not only for the Government, federally, but involves the State Government.

Senator STENNIS. Oh, yes.

General SARNOFF. And it involves the public, generally, and all of us, individually. I think all of us are responsible for that situation.

Senator STENNIS. I think so. I have said it goes back to the parents, because I am a curriculum man myself. I think we have yielded there and left out the courses that require the effort, the self-discipline, the real mental training. We have left the emphasis off it, and, therefore, the children naturally follow along to the lesser, the softer courses, the lesser important ones. The tendency is to, and we have got to go back and redo the job, not from the ground up, but from the parent up, and let the parent emphasize these essential subjects more, and then have more teachers prepared to do the special teaching.

Well, we thank you again, sir, for your very valuable testimony here. You have given us some very fine suggestions, and your observations are not only interesting, but I think they are very important, and you have brought some very sound proposals before us.

General SARNOFF. Thank you, Mr. Chairman, and I wish to thank all the members of the committee and counsel for the very great courtesy which I have received at your hands.

Senator STENNIS. Thank you again.

Is there any other matter to come before the committee?

If not, the committee will take a recess now until 2:30 this afternoon, a closed session, in the Armed Services Committee room in the Senate Office Building, at which time we will hear the Navy witnesses.

(Thereupon, at 12:10 p. m., the subcommittee recessed, to reconvene in closed session at 2:30 p. m. of the same day.)

INQUIRY INTO SATELLITE AND MISSILE PROGRAMS

WEDNESDAY, JANUARY 15, 1958

UNITED STATES SENATE,
PREPAREDNESS INVESTIGATING SUBCOMMITTEE,
OF THE COMMITTEE ON ARMED SERVICES,
Washington, D. C.

The subcommittee met, pursuant to recess, at 10 a. m., in the Old Supreme Court Chamber, United States Capitol, Senator John Stennis presiding.

Present: Senators Stennis, Johnson, Symington, Saltonstall.

Also present: Senator Bush, member of the Committee on Armed Services.

Edwin L. Weisl, chief counsel; Cyrus R. Vance, counsel; Gerald Siegel, associate counsel; Solis Horwitz, associate counsel; Daniel F. McGillicuddy, associate counsel; Stuart French, associate counsel; Edwin L. Weisl, Jr., assistant special counsel; Edward C. Welsh, staff adviser, and K. E. BeLieu, staff of the Committee on Armed Services.

Senator STENNIS. The committee will come to order, please.

I first want to express the extreme regret of Chairman Johnson and also Senator Saltonstall at their inability to be present this morning due solely to the fact that they are compelled to go before the Rules Committee, the Senate Rules Committee, concerning the yearly review of the activities of this and other committees.

They could not let someone else substitute for them. They expect to get here just as soon as they can, as well as other members of the subcommittee.

We have with us this morning Mr. Robert E. Gross and also Mr. Root and Mr. Bailey, all of whom are with the Lockheed Aircraft Corp.

Mr. Gross will be the principal witness and I will read a brief biography into the record.

Mr. Robert E. Gross was born in Boston, Mass., on May 11, 1897, and received an A. B. degree from Harvard University in 1919. He is chairman of the board and chief executive officer of the Lockheed Aircraft Corp., director of Pacific Finance Corp. California, director of the Security First National Bank of Los Angeles. His company is the prime contractor for Polaris and a number of important military and civilian aircraft contracts and others. I will call out just a few, having to do with the antisubmarine patrol aircraft, the airborne early warning radar aircraft, supersonic jet fighter aircraft, United States Air Force jet trainer aircraft, United States Navy jet trainer aircraft, prop-jet combat transports, prop-jet cargo trans-

ports, prop-jet passenger transports, and a number of other related matters.

Mr. Gross, we are certainly glad to have you here, sir, you and your associates. We feel like your testimony will come from one who has had very valuable practical experience and that it will be of value to the committee and to the Congress and to the people.

If you three gentlemen, in keeping with the committee's standard practice for all witnesses, if you will stand now and be sworn, please.

Do you solemnly swear that your testimony before this committee will be the truth, the whole truth, and nothing but the truth, so help you God?

Mr. Gross. I do.

Mr. Root. I do.

Mr. Bailey. I do.

Senator STENNIS. Mr. Gross, do you have a prepared statement?

Mr. Gross. Yes, Senator, I do.

Senator STENNIS. All right, sir, you may proceed after which you will be questioned by counsel and then by individual members of the committee.

TESTIMONY OF ROBERT E. GROSS, CHAIRMAN OF THE BOARD AND CHIEF EXECUTIVE OFFICER, LOCKHEED AIRCRAFT CORP.; ACCOMPANIED BY L. EUGENE ROOT, VICE PRESIDENT OF LOCKHEED AND GENERAL MANAGER OF THE MISSILE SYSTEMS DIVISION; AND R. A. BAILEY, CHIEF ADVANCED SYSTEMS RESEARCH ENGINEER, LOCKHEED CALIFORNIA DIVISION

Mr. Gross. Mr. Chairman and members of the committee, thank you for the invitation to appear before your committee. Certainly the investigation your committee is conducting on behalf of the American people is a timely one and of utmost importance.

The recent turn of events, as exemplified by the launching of the Russian satellites, has clearly indicated that we must substantially increase the emphasis and quicken the tempo of our defense effort. We must devote a far greater portion of our Nation's human and material resources to fields that directly affect our security.

This will require a herculean effort if we are to neutralize the advantage Russia unquestionably holds today. But we are entirely capable of achieving our goal if we will apply ourselves and if we are willing to act with the decisiveness the situation demands.

Before getting to the precise subject I was invited to discuss, I would like to make brief reference to a closely related subject which I believe is of great importance.

While the recent Russian accomplishments are highly dramatic and they serve to focus attention on the ultimate potential of missiles, we must not allow ourselves to concentrate our efforts in this field to the neglect of more conventional but proven weapons.

We must not place our reliance on missiles to the point of unbalancing the total pattern of military strength we shall need during the next few years—strength we shall need to deter aggression, and to fight large or brush fire wars if necessary.

UNTIL WE HAVE NEW MISSILES INTERIM STRENGTH MUST BE PRESERVED

The Air Force estimates that ultimately missiles will handle 90 percent of air defense missions, 50 percent of Strategic Air Command jobs, and 30 percent of tactical missions. But that is some years down the road. In the interim period, until missiles can be developed, tested, and perfected to fill their ultimate roles, the military services must maintain their strength for all kinds of threats to our national security. This means threats from enemy missiles, submarines, high altitude bombers, low level bombers, surface vessels, and ground forces.

For these defense jobs, some interim and others long term, we need manned airplanes of many types.

We need them for long- and short-range missions, for all-out and brush-fire warfare, for transport of personnel and supplies, for communications and patrol, for training and combat proficiency, for rescue and special missions. And we need missiles, not only ballistic types with varying ranges, but air-to-air, air-to-surface, and surface-to-air.

Now back to the main subject.

I recognize, as we all do, that the total defense problem is one of tremendous complexity and there is no magic formula for success. I do feel, however, that there are two basic weaknesses in our program that overshadow all others. Their correction is an absolute prerequisite if we are to achieve our goal of world supremacy in the design, development and production of weapons for defense.

The first of these is the alarming lack of a firm, clear-cut policy of national defense with a definite, long-range plan for implementing it. Such a policy must stem from the President of the United States as the Nation's Chief Executive and be concurred in by the Congress. It is not the responsibility of our military services. But when the policy is determined and the broad plan evolved, it becomes their responsibility to carry it out within reasonable guidelines established by the Chief Executive and the Congress.

Although the growing Soviet strength has been known for some years, we have not geared our defense program to cope with today's realities. Although we face a national crisis as grave as any in our history short of actual war, we have been more concerned with balanced budgets, reduced taxes and business as usual than with security from atomic annihilation.

It is rather ironical that in the same newspapers recording the Russian sputniks were reports of cutbacks, stretchouts and cancellations of contracts for weapons essential to our Armed Forces because of funding problems and payment limitations.

It is high time we, as a nation, face the facts of life. The people must be told the gravity of our situation and what is required to strengthen our defenses and regain our respect in the community of nations.

This demands strong, positive leadership, a realistic reappraisal of our defense requirements, a renunciation of political considerations, a workable plan and adequate funds to get the job done. The responsibility for these policy decisions rests primarily with the President, the Department of Defense and the civilian departments of the military services.

I am convinced that the American people want to know the facts and that the people themselves are ready, willing and able to do whatever is necessary to accomplish our defense objectives.

And I am equally certain that if the armed services are given a plan of action, coupled with both responsibility and authority to act within the plan, they will team with the scientific and industrial forces of this Nation to meet today's crisis and any future eventualities.

COMPLEXITY OF PROCUREMENT PROCEDURES THE GREAT OBSTACLE

The second point I want to touch upon is closely related to the first. I refer to the ponderous and cumbersome procurement procedures inherent in this system that make it virtually impossible to get the quick decisions that are fundamental to any effective development program.

I know this has been brought to your attention before, but, in my opinion, it is so basic that I want to stress it again. It is the most important single obstacle to be overcome.

Under prevailing conditions, private contractors dealing with Government procurement agencies find themselves bogged down in a labyrinth of offices, commands and bureaus; of committees, staffs and boards; and of advisers advising advisers. It is no exaggeration to say that we are often "helped to death" by the hierarchy of Government agencies.

The traditional approach to difficult problems has been threefold: (1) to hire more people; (2) add another layer of organization on top of an already unwieldy and topheavy structure; (3) put up too little money too late at the start of a project—and often, later on, to pile the money in overnight and then expect the results overnight. This philosophy is wrong. The inevitable result is indecision, waste and intolerable delay.

The mere allocation of numbers of people and just money alone won't necessarily get the work done well. Fewer, better people in simpler organization will get the programs done quicker, cheaper and better.

What we need is quality—quality combined with simplicity.

One of the most profitable exercises that could be done now would be to take one of today's operational weapons and retrace the myriad steps and organizations it had to swim through before getting to be an operational weapon in the inventory. I believe the results would be appalling.

Private companies must keep lean and simple to do their jobs and stay in business. In the nondefense, commercial end of our business we are able to do this. For instance, we work with an airline on the design of a transport aircraft. Requirements are studied, design agreed upon, development and production begun and 2 or 3 years later it flies, meeting its speed requirements within a mile an hour, its weight limitations within a fraction of 1 percent, passes exhaustive flight tests and then flies away from our airport with a full load of passengers to begin years of reliable service. And yes, during the development and production phases we have incorporated hundreds of changes to take advantage of technological advances and meet changed customer requirements.

ABSENCE OF REDTAPE MAKES THE DIFFERENCE

How are we able to do this? For one major reason: simplicity of organization. The customer and the contractor are able to reach quick decisions and we don't get hopelessly enmeshed in a tangle of red tape.

I cite these examples only because they show what the private aircraft manufacturing industry can do when freed of the fetters of endless red tape, and when the customers with whom we do business are free to make decisions, unhampered by political considerations, and without interference from a multiplicity of overriding authorities.

Contrast this, if you will, with the all too frequent situation in relationship to military contracts of all kinds where a relatively minor decision must pass through literally a score or more of offices, departments, bureaus and commands before a determination is made. The inevitable result is delay, inaction and waste.

I do not presume to say that the military services are perfect, nor do I say that private industry is without fault. But I do say that if the armed services are given a plan and the authority to make decisions within their fields of responsibility and freed of redtape and interference, they will get the job done and they will do it efficiently.

But if we continue the situation where highly trained, experienced, and dedicated military officers of high rank cannot make on-the-spot decisions, which in time of war would be made by junior officers, we can look forward to continued delays, confusion, and profligate waste.

While there are many imponderables in this whole situation, one thing is certain in my mind: We have at our command the human and material resources with which to provide for our Nation's defense. If we give our military service and industry a plan of action and the responsibility and authority required to accomplish it, we can soon regain our position of leadership and be prepared to defend ourselves against any aggressor.

Again I thank you for the opportunity to appear before this committee and I am at your service for any questions you may care to address to me. In the event you have questions of a technical nature on subjects with which I may not be familiar, I have two of my associates with me whom I would like to introduce at this time:

Mr. L. Eugene Root is vice president of Lockheed and general manager of our missile systems division. He is a graduate of California Institute of Technology and has spent more than 20 years in the aircraft and missile fields. He came to Lockheed in 1953 from the Rand Corp. Mr. Root is a specialist in air weapons research.

Mr. R. A. Bailey is chief advanced systems research engineer of Lockheed's California division, educated at UCLA and Curtiss-Wright Aeronautical Institute. He has had 20 years experience in the aircraft industry and is a specialist in antisubmarine warfare and airborne early warning systems.

Senator JOHNSON (presiding). Thank you, Mr. Gross. I want to express my appreciation to Senator Stennis for presiding in my absence. I had to be at the Rules Committee this morning.

Mr. Gross, I heard the latter part of your statement and was quite impressed by it. Under our procedure, counsel will proceed to examine you.

Mr. Gross. Yes, sir.

BYPASSING PENTAGON LABYRINTH BROUGHT AIRPLANE IN 9 MONTHS

Mr. WEISL. Mr. Gross, I want to compliment you on the courageous and constructive statement which you have made. I would like to ask you, to begin with, this question: In your statement you point out that private contractors dealing with the Government procurement agencies find themselves bogged down in a labyrinth of offices, commands, bureaus, committees, staffs, boards, advisers advising advisers. In your opinion, is that one of the principal reasons why it takes us almost twice as long to make a weapons system as it does the Russians?

Mr. GROSS. I feel that our system is too complicated.

Mr. WEISL. Can you give the committee some examples of how you were able to do away with this labyrinth, this layer upon layer of advisers in your own business?

Mr. GROSS. Well, I recall to mind very easily—

Mr. WEISL. I would like to call your attention to the Jet Star, for instance. Tell the committee how you were able to do that, when you did not have to go through this labyrinth of bureaucracy?

Mr. GROSS. Yes. Well, this is an aircraft which is an interesting one and for which apparently there would be some military as well as commercial use, and our company and others decided to enter, if you will call it, sort of an informal competition for this type of plane, and we decided that we would build this with our own capital, using our own procedures and following the most efficient and the simplest possible plan of development.

In this case we simply looked at the broad requirements which the Air Force had indicated would be desirable in such a model, and without having to go through, as I say, the labyrinth of the classic Air Force developmental organization, we simply went ahead and built the airplane ourselves. We did not make the decision to start this airplane until the 4th of January of 1957, and we took a clean piece of paper, started from there, designed the airplane, built the airplane and flew the airplane within 9 months.

Mr. WEISL. So that by disregarding this labyrinth of bureaucracy, you were able to build this jet plane for the military service in 9 months. How long would it have taken you, do you think, if you had followed what you described as this labyrinth of committee on top of committee, and so forth?

COMPLICATED PROCEDURES AVOIDED BECAUSE THERE WAS NO FORMAL COMPETITION

Mr. GROSS. In answering that, sir, I would like to possibly correct one implication that your question may give. We have not built this airplane within the limits of a formal Air Force competition. This was simply an indication by the military authorities that there might be a demand for this plane, so we did not have to go through the complicated procedures that are involved in a formal military competition.

It is not that we disregarded it. It is that we did not have to follow it. I would like to make that very clear.

Mr. WEISL. I understand, Mr. Gross.

Mr. GROSS. To continue, I suppose that if this airplane or ones like it had had to run the gamut of the entire procedural organiza-

tion, I suppose that it would have taken between 2½ and 3 years from the start of the project until it was flown.

Mr. WEISL. And you were able to do it in 9 months?

Mr. GROSS. Yes, sir.

Senator JOHNSON. Counsel, would you yield to Senator Saltonstall? He must leave.

Senator Saltonstall, you are recognized.

Senator SALTONSTALL. Thank you, Mr. Chairman.

Mr. GROSS, I wanted to come over because of our association a great many years ago, and I wanted to pay my respects to you. I have to go, but do I summarize you correctly when I say you are a strong believer in maintaining our present strength with the weapons that we have at hand until the new ones are proven, that we ought to have a long-range policy, that we ought to let our people know where we stand and what we are doing, and essentially, from your point of view and your company, the Lockheed Corp., we want to simplify procurement procedures and give more authority to the officers actually in charge rather than to have large overhead and delay at the Pentagon?

Does that summarize what you have said pretty well?

Mr. GROSS. That certainly is the spirit of what we are trying to say, yes, sir. It is indeed.

Senator SALTONSTALL. And from your point of view and that of your company, what you want to do is have someone you can deal with, who has full authority?

Mr. GROSS. We would like to shorten the lines of communication, responsibility and authority. It is as simple as that.

Senator SALTONSTALL. It is good to see you in Washington, and I know the respect in which the people here hold your company and you.

Mr. GROSS. Thank you very much, sir.

Senator JOHNSON. Counsel, proceed with your questioning.

DO NOT PENALIZE PATRIOTISM—INCREASE MILITARY PAY

Mr. WEISL. Have you any suggestions to offer to this committee as to how this redtape can be eliminated?

Mr. GROSS. Well, of course, this is the difficult thing. It is very easy to criticize, and oftentimes it is very hard to recommend. I think there are some very, very basic things that have to be done or ought to be done.

First, although the reduction of force is something that I think should be worked on immediately, I think that underlying all this situation, and where I take the view that quality as opposed to quantity is indicated and desirable, I believe that we ought to make, in the first place, the military career itself more rewarding.

In plain language, I think we ought to have a higher rate of military pay.

I think that on the civilian side we ought to face up to this conflict of interest matter. I have no feeling that patriotism ought to be rewarded, because I think that Americans right across the board are patriotic people, and we don't expect to be rewarded for patriotism.

But I don't think it is right for patriotism to be penalized, so that

when we invite civilians to join our Government—and we must—I don't like to see them penalized for their Government service.

And I believe that our present restrictions, ideal in their aims as they may be, are practically unrealistic. However, to address myself directly to your question, I feel that it is a simple matter of reducing force, except in the operational units of our services—I am not talking about having a smaller fighting force or smaller field forces, but I am talking about the procurement end, the contractual end and the engineering end, and the developmental process, and I think it is a question of getting rid of people and paying more to the ones we have left.

Now, I know that it is a hard thing to reduce forces, even in the areas in which I am talking. But industry has to do it, and certainly in the civilian levels of our Department of Defense and in the civilian areas of our services, there could be reductions. I feel this is very important.

Years ago I remember, in World War II, there was a tremendous organization at Wright Field, and we were faced with a similar situation to what we have today. Then we were at war. I quite well remember that our Government sent back to Wright Field a general. I think he has now passed away. But he went back there, and in a few weeks' time, I think there was a reduction by several thousand people in the Wright Field organization, and our procedures showed an immediate, almost an instantaneous improvement.

Now this, of course, is something that happened years and years ago, but I recall it well, and I just feel that the essence of what we must do is, in one way or another, reduce our civilian levels in the Department of Defense, our civilian numbers. But I think it should also apply to the military services themselves.

RECOMMENDATION FOR PERSONNEL CUTS LIMITED TO PROCUREMENT AREA

But I want to make my point very clear. I am only talking about the procurement, the developmental, and the contractual ends of it.

Mr. WEISL. Have you any other suggestions, Mr. Gross?

Mr. GROSS. In what areas, sir?

Mr. WEISL. In the recommendations that we streamline the Department of Defense to avoid what you call our intolerable lag in decision-making?

Mr. GROSS. I feel this way: It seems to me that when the Department of Defense was created, the architects of the plan intended that the Department of Defense should be a policymaking body, and a coordinating body only.

I feel that it has become more than that. I think it has become a functional organization, and that it duplicates some of the things that the services are doing. I think the developmental work should be pushed down in the services where it belongs, but I think the Department of Defense should confine itself to policymaking and to coordination.

I would hope that the Department of Defense would have within it a very small but a very talented—and when I say “small,” I mean small, a dozen or so; and when I say “talented,” I mean the best people you can find—who would be able to give our Secretary of Defense, whoever he might be and under what government he might be,

the adequate technical advice and counsel and opinions that he might need.

But I say that the thing has simply gotten out of hand, and it has gone too far.

Mr. WEISL. I believe we discussed the figures showing the tremendous growth of the Department of Defense. In 1947, as was pointed out, the Secretary of Defense had about a hundred people.

Mr. GROSS. Yes.

Mr. WEISL. Today he has 8 Assistant Secretaries, 4 special assistants, and 2,400 other people assisting him.

Mr. GROSS. Yes.

Mr. WEISL. And it your recommendation that this be substantially cut down in order to avoid the tremendous lag in getting things done?

Mr. GROSS. Yes.

Mr. WEISL. Now, how can we attract talented people to these positions, Mr. Gross?

Mr. GROSS. Well, I alluded to that before.

Mr. WEISL. You mentioned the conflict-of-interest rule.

Mr. GROSS. Yes.

Mr. WEISL. And the increased salaries so that people won't be penalized for their patriotic service.

Mr. GROSS. Yes.

Mr. WEISL. Is there anything else that you can suggest?

COMPLEXITY OF PENTAGON MAY SCARE OFF TALENTED PEOPLE

Mr. GROSS. I should think that a mere expression of a determination to simplify the process and reduce it will attract some people. I think one of the things which may keep people away from going into this Government service, is that they themselves are appalled and frustrated at the prospect of coming into such a complicated organization.

So I think the simple declaration that we were determined to prune this tree and get back to a hard, virile trunk, would alone create some inspiration in these men.

Mr. WEISL. Our investigation indicates that the average tenure of a civilian employee in the Department of Defense is 18 months. Do you think that is long enough to create the knowledge that is necessary to perform the duties of the civilian?

Mr. GROSS. No, sir; no, sir, I do not.

I very much fear that these good gentlemen who come and take these positions, and they are dedicated men who do it, I think it takes them several months, several months to become acclimated and educated to the problems. And then I am afraid that after a few months more of service, human nature being what it is, they begin to consider the possibility of going back to civilian life.

So for the last few months they are wondering about their return to civilian life, and in the first few months they are becoming educated, so as a result there is a very, very limited span of what I would call real productive service.

This is no reflection on the people. It is the process.

Mr. WEISL. Mr. Gross, I think it would be important if you could give some other illustrations of how Lockheed was able to cut this lead time down, and I call your attention specifically to the F-80

and the F-90 and the F-104, how you were able to do this when you did it, on your own, without going through the procedures that are now required.

Mr. GROSS. Well, take the F-80, for example, to go way back. It is a little difficult to reconstruct these circumstances after more than 10 years, but I remember the process all right.

But what actually happened? This was a military project—a full-blown military project. We made the proposal to the Government saying that if given a go-ahead and given the priorities, and if the lines of responsibility and authority would be shortened and simplified we would produce a flying prototype in the incredibly short time of 6 months.

The Air Force response to that was splendid. This, mind you, was done actually in the war, in World War II. The Air Force nominated a very small cadre of officers, I think only 2 or 3.

We took from our company a mere handful, maybe 100 or 150 of our best people. We put a man in charge. We had a small and distinguished military organization, 2 or 3 people, who could say “yes” right on the spot, and were given the authority by the military to say “yes.”

F-80 BUILT AND FLOWN IN 150 DAYS

And we gave our man the authority to make decisions, and with these two working together with, I think, less than 150 people, the airplane was built and flown in 150 days.

It went on to be the first operational jet fighter in the United States, and we built thousands and thousands of them, and it was a fine airplane. It was even in the Korean war; 10 years later it was in Korea.

Now, we would not have had that airplane in anything like that time, and we got it millions cheaper than we would have gotten it, had we gone the other route.

That airplane was built in 150 days, mind you, in the middle of the war. If we had had to go through the normal military procedure, we would not have had it for 3 or 4 years later.

Mr. WEISL. In other words, you saved several years in time?

Mr. GROSS. And millions of dollars.

Mr. WEISL. And you saved an enormous amount of money and expense by having somebody on the spot in the Government say yes or no, and somebody in your organization with authority to say yes or no?

Mr. GROSS. Yes.

Mr. WEISL. Now why can't that be done today with our missile program?

Mr. GROSS. Well, I think because with the passage of time whenever we have had a new problem, as I said in my statement, our tendency has become to just pour in more people.

Mr. WEISL. You mean the Government's tendency, not your tendency?

Mr. GROSS. That is right; our Government tendency has been layer upon layer of new people, and also to nominate new committees and new advisory boards and new consulting boards. I think this is how it has happened. It is not anything that happened yesterday or the day before or a year ago or 2 years ago. It has been going on for

years and years and years and years. It is the cumulative effect of this constant turnover in the Defense Department.

Now in your ballistic-missile program, you already have made a start by the appointment of General Schriever and by giving him a projectized type of organization, and I think you are going to get encouraging results from that provided he does not have to swim through too much seaweed.

Senator JOHNSON. Provided he did not have to what?

Mr. GROSS. I said swim through too much seaweed, sir.

Now the Navy Department in this Polaris missile—and we are in that one up to our necks—

Mr. WEISL. Tell the committee about that Polaris program, please.

Mr. GROSS. I want my associate, Mr. Root, to do that, but the Navy has set that project up on a pretty streamlined basis, and I think you are going to get tremendous results out of that one.

Would you like to say something about that, Mr. Root?

Mr. Root. Yes, sir; I would be pleased to.

THE PENTAGON "SEAWEED" DELAYED START OF PROJECT

Senator JOHNSON. Could I ask one question before you get away from General Schriever, if counsel will yield to me there.

Have you seen any evidence that General Schriever is having to swim through seaweed?

Mr. GROSS. Yes, sir; yes, sir, I think so.

Senator JOHNSON. Would you care to elaborate on that a little?

Mr. GROSS. Well, we have a project which I would like to discuss if we have the opportunity to have a closed session, I would like to discuss it there, but I can make this generalization: that this is a project that he had a very hard time getting started, and there were many delays in its getting started because I think he had to swim through seaweed. I would like to—

Senator JOHNSON. Pentagon redtape delayed the start of a project which you thought was essential to the national welfare, and these committees and—

Mr. GROSS. And he did too, I know he did. I would like to discuss that if we could, sir—

Senator JOHNSON. You would like to go into more detail in closed session?

Mr. GROSS. Yes, sir; in full detail.

Senator JOHNSON. Thank you, counsel.

Mr. WEISL. Mr. Root, in the Polaris program the Navy did put someone in charge, did they not, with power?

Mr. Root. Yes, sir; they did. Admiral Raborn has been appointed the weapons system manager for the Polaris submarine system. We have a rather unique situation there where he has been given the authority to say "yes" or "no," as it was put earlier, and furthermore, a rather unique arrangement that involves a steering group, the members of this group representing those who are having to do the work. This group has referred to it the questions for decision to aid Admiral Raborn, and having furnished that aid and the decision given, they get back home and do it. It is a very effective working team proposition. We had the usual difficulties at the beginning in getting

our team formed, and I think now that we are used to working with each other, we have a real fine working arrangement, a partnership to get on with this job.

Mr. WEISL. Mr. Root, I believe you wrote us that you had at the beginning, until about the middle of last year, trouble with restrictions on overtime in connection with the Polaris program; did you not?

Mr. Root. Yes, sir; we did initially. However, those difficulties have been removed by giving an adequate priority to the system, and we have unlimited overtime at the present wherein we ask for it and we get it.

Mr. WEISL. You also wrote us that had additional funds been available the schedules for development and testing could have been set at a faster pace?

USE OF NAVY MANAGEMENT FUND HAS ACCELERATED PROGRAM

Mr. Root. There is a proposal for a program acceleration, and I think that is under consideration at the present time. If this goes ahead, I think we are moving as fast as we can on the R. and D. end of it. One of the problems we had in the R. and D. area was having to deal with about a half dozen different kinds of funding.

That too has been fixed by Mr. McNeil, suggesting that there be a Navy management fund which allows the appropriation of the moneys and an accounting on a monthly basis, still with the very clean-cut protective custody of where funds are used. In other words, the public interest is still served.

However, you can get on with it. It is difficult, for example, to do R. and D. with construction funds, and some flexibility that this arrangement provides, which is similar to that of the atomic testing arrangement, gives the flexibility that we needed.

Mr. WEISL. Has this special fund been provided for now?

Mr. Root. Yes, sir, as I understand it in January 1958, this arrangement was started.

Mr. WEISL. And could the Polaris program be accelerated substantially if additional funds were provided?

Mr. Root. Yes, sir. There has to be a distinction made here between the research and development phase and the production phase and the equipping of, you might say, a national capability. In the production end of it, in the complete weapons system it is my opinion that we could stand an acceleration and a considerably greater funding than we now have, and could get on with having a completely operational weapons system faster.

However, in the R. and D. side of it we are working just about as fast as it is humanly possible to work, unlimited overtime, 50- or 60-hour week and all that sort of thing.

We are working like mad.

ENTIRE WEAPONS SYSTEM FOR POLARIS COULD BE ACCELERATED

Mr. WEISL. I understand that this plan for acceleration is being requested by the Navy at the present time?

Mr. Root. Yes, sir, as I understand it there are two plans under consideration, the one that is called accelerated and one that is called superaccelerated or augmented and accelerated.

Mr. WEISL. And if either one of these plans are accelerated the production of the Polaris will be expedited; will it not?

Mr. Root. The Polaris submarine system; in other words, the means of getting the whole arrangement to be an effective——

Senator JOHNSON. I am having a little difficulty hearing the witness. If he would speak a little louder I would appreciate it.

Mr. Root. All right, sir. Perhaps I had better repeat what I just said: that the weapons system as a complete working arrangement with the carrying device and the missiles could be accelerated a great deal.

This is in the production phase, and the responsibility for the whole system is Admiral Raborn's. As a company, as you know, we have the Polaris system responsibility.

In other words, we are responsible for the missile itself and the testing of the missile.

Mr. Gross. As opposed to the ship side of it.

Mr. WEISL. And who is responsible for the submarine that will eventually launch the Polaris when the Polaris missile becomes operational?

Mr. Root. Admiral Raborn with his running partner, the Bureau of Ships, is responsible for that part.

Mr. WEISL. And who in the Bureau of Ships is responsible for it?

Mr. Root. I know a name, Admiral Mumma, who is a very accomplished chap and has a group of submarine designers under him. He is a very able fellow.

Mr. WEISL. Admiral Mumma is able, but he is the head of the whole Bureau of Ships. Is anyone specifically assigned to this critical problem?

Mr. Root. Yes, sir, the Bureau of Ships has a real able handpicked group working for Admiral Raborn, and of course this is the novelty of this arrangement where he has drawn from capable officers throughout the whole Navy, pulled them together.

Mr. Gross. There is one thing I would like to say while we are talking about suggestions to speed things and simplify things.

Mr. WEISL. Yes, Mr. Gross.

SECURITY CLEARANCE FOR SUBCONTRACTORS SHOULD BE EXPEDITED

Mr. Gross. That is the question of getting a better process for clearing the security of our projects.

I am not talking about trying to get marginal people working on any of these projects. I am talking about the speed with which we can get the right to talk to others including vendors, the people that we have to get in on these systems with us.

Many times our fellows want to get a distinguished company or some small company into the business, and we want small companies into the business with us on this thing, but we are prevented from even discussing it with them for sometimes weeks on end, and consequently we can't get our arrangements going as fast as we could.

We ought to have some way to speed up the security clearance as to who we can talk to. I feel it would be beneficial if these projects could be opened up more and we did not have to work on them under such wraps. This in itself impedes progress.

Now another thing, talking about other companies taking a part of this thing. I want to be very clear that what we want to have in the aircraft business is the weapons system responsibility. We do not want to do all the work ourselves because we cannot do it all ourselves and we are not qualified to do it all ourselves, but we do want to have the coordinating responsibility to pull the projects together.

We want the responsibility, the weapons system responsibility for everything that flies, but we do not want to make everything that goes into the missile ourselves because we cannot do it.

Mr. WEISL. Don't you have that responsibility now as the chief contractor for the Polaris?

Mr. GROSS. That is right, we have it, and that is one of the reasons I think we will make it go, but this is not always the case. I am not talking about the Lockheed company. I am talking about the industrial problem. I am talking as a matter of principle I think that as we go down the road in this big program, that the aircraft industry is the one to have the weapons systems responsibility.

We have it in this particular matter, but the air industry has not always had it and it might be changed.

I am simply saying as a recommendation that I think that the air industry ought to have this weapons system responsibility.

Mr. WEISL. What is superimposed upon the aircraft industry now?

Mr. GROSS. What I mean is that the weapons system responsibility could be given to another industry for this work.

Mr. WEISL. You say that the aircraft industry should have the responsibility of coordinating the manufacture and operational capabilities of a weapons system.

You do have it in the Polaris?

Mr. GROSS. Sure.

Mr. WEISL. But you don't have it in other weapons systems?

KEEP AIR PRODUCTS RESPONSIBILITY WITHIN AIR INDUSTRY

Mr. GROSS. I did not say that. I said that we do have it in the Polaris, and air companies do have it in other projects as well.

What I am saying is this is right and this principle should be adhered to, and we should not, if I may say so, we should not adopt the policy of giving the weapons systems responsibility for these air products to nonair companies. That is all I am saying. And this could happen.

There have been times when the responsibility has been given to other industries.

Mr. WEISL. One more question, Mr. Root, before my time expires.

Senator JOHNSON. Your time has expired, counsel, but go ahead.

Mr. WEISL. Have you any suggestions as to how the Polaris program can be accelerated from your position of the manufacturer of the missile?

Mr. Root. Yes, sir. My feeling is, answering as one having to do with the missile and the team of subcontractors, Aerojet General, General Electric and MIT, with Westinghouse linking us with the ship and the missile—

Senator JOHNSON. Speak a little louder. I am having trouble hearing you.

Mr. Root. Right. O. K. I was indicating that the team which we have gotten together, the subcontractors, Aerojet General, the General Electric people, cocontractor MIT with Westinghouse doing the launching which provides the connecting link between ship and the missile, that as the system manager for the Polaris itself I feel that the crux of the matter is getting on with the funding from a national military posture standpoint by an order of about 10 in carrying on with the complete system.

In other words, we are fooling around by about one-tenth of the order that we should be in getting this show on the road, and I think that on this basis we should give serious attention to the augmented and accelerated case.

Mr. WEISL. Thank you, Mr. Chairman.

CONCERN WITH NATIONAL BUDGET IN FACE OF THREAT OF ANNIHILATION

Senator JOHNSON. Mr. Gross, I want to commend you on what I consider to be one of the best statements that has been made to this committee. I think you demonstrate vision and courage and I wish that every American could read what you have testified to this morning. I want to repeat some of it for emphasis and as the basis for some questions.

You say, and I quote :

Although the growing Soviet strength has been known for some years, we have not geared our defense program to cope with today's realities. Although we face a national crisis as grave as any in our history short of actual war, we have been more concerned with balanced budgets, reduced taxes and business as usual than with security from atomic annihilation.

And further on :

It is high time we, as a nation, face the facts of life. The people must be told the gravity of our situation and what is required to strengthen our defenses and regain our respect in the community of nations.

Now, summarizing your statement, I think, in essence, you said that first we have to tell the truth to all of our people because the judgment of our people is no better than their information.

Second, that we must have firm, clear-cut policies, and then cut red-tape and get simplicity of organization in order to get the job done.

Does that summarize what you are saying to this committee?

Mr. GROSS. That is what it says right there.

Senator JOHNSON. You say we must devote a greater portion of our resources to security. What do you estimate this portion to be? Have you seen the budget for this year? Have you seen the recommendations made to us? Do you think we are doing as much as we ought to be doing as quickly as we ought to be?

Mr. GROSS. I have not seen the detailed budget. I do think from what I read and what I am told, I think we are headed in the right direction. I am not sure you are going far enough, but I think you are in the right direction.

Senator JOHNSON. What are your recommendations, the steps that we should take to provide what you describe as security from atomic annihilation?

Mr. GROSS. I think I have certainly hit the high spots pretty well in my statement. I feel that again we must simplify our developmental process.

FIRST STEP IS TO REDUCE NUMBER OF COMMITTEES

Senator JOHNSON. All right. Now, let us just quit talking in glittering generalities. Let us get right down to the meat in the matter. If you were Secretary of Defense, the first thing you would do is walk through there with a meat ax and abolish a bunch of committees, is that right? Is that what you are saying to this committee?

Mr. GROSS. I am urging that attitude; yes, sir. I am urging that.

Senator JOHNSON. You want to stress the point that the Defense Department's organization has become so cumbersome——

Mr. GROSS. That is right.

Senator JOHNSON. That people are helped to an early grave. That is what you said, was it not?

Mr. GROSS. That is right.

Senator JOHNSON. They help you to death, they advise you to death. They advise and advise and help and help and delay and delay. That is the net of it, is it not?

Mr. GROSS. Yes.

Senator JOHNSON. So you think that we must find some method of simplifying the organization of our defense structure? That is what you are saying?

Mr. GROSS. I do.

Senator JOHNSON. Outside of abolishing a bunch of committees, sending some advisory folks home, centralizing some authority and saying to the military men out in the field that we are going to give the general who is stationed at a plant as much authority as we give a lieutenant in battle, what else would you do?

Mr. GROSS. I think if we did that, we would have the job done. I do not think there is much more to be done. I think that is it.

Senator JOHNSON. We had witness after witness after witness testify to this committee that the one thing that was delaying us a great deal was the lack of authority of the contracting officer at the contractor's plan. Do you find that true?

Mr. GROSS. This is a part of it, sure. This is a part of it. It isn't everything but it is a part of it.

Senator JOHNSON. So our system of checks and balances has us enmeshed in seaweed and we cannot swim through. What we had better do is to have a little more balance and a little less check, is that right?

Mr. GROSS. Yes, sir.

WARNING SYSTEMS INCLUDING SUBMARINE DETECTION
MUST BE STRENGTHENED

Senator JOHNSON. Mr. Gross, in your opinion, have we been placing enough emphasis on research and development into new weapons systems? That includes new scientific achievements. And if we have not, what would you recommend we do?

Mr. GROSS. Answering your question, I do not think we have spent enough money or put enough accent on it. I do think that we must work harder in warning. I think our warning systems must be strengthened, and I think a great deal of research work and effort must be put into that problem.

Take, for example, this Polaris submarine system that we are working on today. This is a magnificent concept for a tremendous weapon. When you think that this article, this submarine, could roam the seas and get in close and fire something, it is almost incredible to see how you defend against it. But did you ever think that the other people can have submarines, too, coming in here and attacking us with maybe the same kind of a thing? Now, in order to prevent that——

Senator JOHNSON. We have thought about it a lot.

Mr. GROSS. We have got to spend just as much effort and time on defending against some of these things as we have having a striking force.

Senator JOHNSON. Not spend as much effort and time, but spend it quickly enough. Now, are we doing that so far as the Polaris is concerned?

We are all very hopeful about the Polaris. It is the one thing that encourages us and stimulates us, makes us feel that there is some hope.

But let me ask you this: Suppose you had the authority, the unquestioned authority, what would you do to speed up and expedite action on the Polaris that would give us the Polaris operational several months ahead of schedule?

Mr. GROSS. I think I would be sure, if I were the Navy, that I could get the authority for the facilities that are going to be needed. The Navy is going to need some more facilities for this thing, and facilities, you know, are hard to get these days. I think if the Navy were sure—or if I were sure, if I were the Navy, that I was going to get my facilities, I feel that the team that has been gotten together, on both the ship side and the missile side, will do the job. I think it will do it.

Senator JOHNSON. Is it your testimony that we are going as fast as we can on the Polaris?

Mr. GROSS. I back up my associate, Mr. Root, when he says that we are going about as fast as we can go in the developmental, in the inventing stage. I think there are some things down the road and we ought to be thinking about them now to beef that thing up for the production side if we get it to be operational, and I think those decisions ought to be taken now.

Senator JOHNSON. All right. Can somebody tell me, 1, 2, 3, 4, what we need to beef it up? You talked about funding in very general terms. I guess that means getting the money.

Mr. GROSS. No; we are not qualified for that. That I think is Admiral Raborn's job. He knows. We know a portion of it and we know what we are going to need, and I hope we will get that and I believe we will. But we cannot tell you the whole system. It is too big. I think Admiral Raborn could.

LONG-RANGE PLANNING FOR PRODUCTION ADVOCATED

Senator JOHNSON. So what you are saying is that you think some steps could be taken to expedite it, but I had better see Admiral Raborn to tell me what they are?

Mr. GROSS. Sure.

Senator JOHNSON. You do not care to make any observations. I have you as a witness this morning. I am going to have Admiral

Raborn appear later. I would like to get everything I can from you while you are here.

Mr. Gross. It is very simple. We are running as fast as we can run on the developmental stage and we are all right on that. Sure, we need a few things. We need this better security thing and we need a few little business things here and there, but I think in the developmental stage we are all right.

What I am urging is that you look down the road at the production stage and get braced up for that one and not come up to the night before you want to put them in production and find we did not authorize anything to do it with.

Senator JOHNSON. What kind of facilities, and in what time?

Mr. Gross. That is for Admiral Raborn and his program.

Senator JOHNSON. I hope counsel will take notice of that, and we will find out from Admiral Raborn.

Mr. Gross. It isn't the aircraft industry's proper role to say how big or how little or what weapons the military ought to have. We are here to do it, and we will do whatever the——

Senator JOHNSON. I am not asking you to say that. I am asking you to tell us how we can get the weapon we have already decided on as quickly as we can get it, and whether there is anything you need that you are not getting that would get it to us any quicker.

Mr. Gross. I guess I have answered that, sir.

ATLAS, NUCLEAR PLANE, EXEMPLIFY OFF-AND-ON PLANNING

Senator JOHNSON. All right.

You mentioned lack of firm, clear-cut policy of national defense and long-range planning, and you stressed the need for positive leadership.

Would you give the committee 2 or 3 examples of the lack of positive leadership which has hindered the work you have been doing so we will have that in the record to support your general statement?

Mr. Gross. Well, I would rather not complain about my own situation. I would like to make a general statement about perhaps some of the things that we should have been doing more consistently in other companies.

For example, the big Atlas missile, I guess this was sort of off and on, and up and down, and in and out, for several years. I think we should have got on that one at the start and stayed with it. We didn't.

In the atomic-powered airplane, the development of nuclear airplanes, we have been drawing pictures on that thing for 10 years, and we've never built anything yet. I don't know whether we are going to. That has been in and out, up and down, on and off.

There are several examples of that kind of thing. It is a very difficult thing to criticize your superiors and the people that you work with and get your living from, but I do feel that we ought to have been more consistent on some of these things.

I think money has been at the root of it.

Senator JOHNSON. This is not just a forum for criticism. What we want to do is be thorough and be comprehensive and, above all, be fair. But we do feel if we cannot go to the outstanding military

leaders of this country, and to the outstanding and dedicated scientists of this Nation, and to the top businessmen that are designing and developing and producing these weapons, and get their advice, then this committee is not going to have the best information that it should.

Mr. GROSS. I think on that score, sir, I want to be very clear about it, I am trying to be objective-minded about it, and I think money has been at the bottom of the thing.

For example, our Air Force was constrained to cancel a contract for a great big cargo airplane, not made by us, made by another company, the Douglas Co. It was a big plane and a fine plane. I think it was too bad that thing had to be stopped.

I don't know. I hope it will get put back in, because down the road you are going to need that kind of thing. You are going to need more transports.

BELIEVES ECONOMY CAN SUPPORT AUGMENTED MILITARY EFFORT

Senator JOHNSON. Just one final question I want to ask, and I want you to answer it as briefly as you can: Do you believe that our economy can and must handle a bigger effort?

Mr. GROSS. I do. And I think the man on the street wants it. I think he wants it. I think he is willing to pay taxes to be sure he is safe.

Senator JOHNSON. And you think that we have placed too strong an emphasis on a balanced budget and too little emphasis on a strong—

Mr. GROSS. I think we have been too rigid on the budget thing; I do.

Senator JOHNSON. Senator Bush?

Senator BUSH. When you speak about budget, you do not object to a balanced budget, do you?

Mr. GROSS. No.

Senator BUSH. What you mean is, too little on the expense side; is that right?

Mr. GROSS. I certainly don't. I want to see a balanced budget.

What I am saying, Senator, is that I think we can up the expenditures and the American people will pay for it. I think the average citizen is willing to pay for it if he's just told the facts.

Senator BUSH. I think that is right.

Mr. GROSS. I think he will work at it.

Senator BUSH. I do not think you meant to leave with the committee the impression that you favored an unbalanced budget.

Mr. GROSS. I certainly do not.

Senator BUSH. In other words, we need to spend more money, but we have got to find that money in some way. We cannot just ignore the fact that if we are going to increase our expense we have got to look for new sources of revenue.

Mr. GROSS. You have got to pay the bill. And what I am saying is, I think the great American, the average man, I think is ready to step up and pay his share of that, every segment across the board.

Senator BUSH. Would you agree, too, on the point, Mr. Gross, that unbalanced budgets have a very definite inflationary effect, which in turn has the effect of increasing the cost of making these weapons, and we get into a vicious circle there which could be overwhelming?

Mr. GROSS. I couldn't agree with you more, sir.

AMERICANS "MUST LEARN TO DO WITHOUT SOME OF THE FRILLS"

Senator BUSH. You said—and incidentally, I want to congratulate Mr. Gross on this very splendid statement. I think it is an excellent statement.

You say this:

It is high time we, as a nation, face the facts of life. The people must be told the gravity of our situation * * *.

Would you care to amplify that statement? How can we make our people more aware of the gravity of this situation? What should we do?

Before you answer. I think it is fair to say that certainly the President in his speeches in recent years has emphasized the gravity of the situation repeatedly. He has spoken of the age of peril in which we live, and so forth and so on.

Last year when he sent down the budget, hands went up, "This is too big, this budget. We have got to do something, cut this down."

You see, there were many efforts here in the Congress in that direction, many speeches made and some efforts made, but the President resisted those so far as they, in his opinion, affected the security of the United States. But nevertheless, they did cut back on some of these items that directly pertained to this question of our national security.

Now, it is a difficult question to make people realize that we are in a very, very dangerous situation. I believe it and I know that you do, and I am sure my colleagues on this committee do.

But have you any specific suggestions that you think would be helpful as to how we are going to make our people really realize the gravity of this situation?

Mr. GROSS. Sure I have.

Senator BUSH. I would like to hear it.

Mr. GROSS. Well, in the first place, I think the thing that has dramatized the immediacy of this problem are these demonstrations of Russian competence. Now I have a theory about that. I think we should not be surprised at anything the Russians do. I think they can do pretty nearly anything they want to do.

And the reason they can do it is because they have been able to concentrate their national competence on a few projects that they consider to be tremendously important.

Now, we cannot do that. The Russians made—I don't know how many they are concentrating on. Maybe they are concentrating on a dozen, 2 dozen or 3 dozen. But we are working on 25,000 things in this country. That is our system, and it has to be, and we must continue to do a good deal of that.

But I think we ought to point out to our people that we have got a system that has wonderful features, but also it has got some drawbacks, and we must not be surprised at anything these other people do.

And maybe we ought to, maybe we should, cut out some of the things we are doing, some of the things that I think we do not need.

I do not want to be pinned down to what they are this morning. But I think we could show our people that we are up against a technical competence that is very, very significant and we have got to learn to do without some of the frills—and I think we can. We have as good

people as anybody in the world, and better, but we have got them spread too thin.

SUGGESTED INCREASES IN DEFENSE SPENDING INADEQUATE

Senator BUSH. Do you think the Congress could help in alerting the people to the gravity of this situation in the way that we talk with our people back home and to the people in the Nation? Do you agree with that?

Mr. GROSS. Yes, I think you could.

Senator BUSH. Do you want to comment on the question of our gross national product more specifically, as to how much you think we could afford to put into the defense effort? Do you have any specific opinion on that?

Mr. GROSS. No, I am not prepared to answer that. I think the suggestions that we have made for an increase, frankly, aren't going to do the job. But how far we go, I think is somewhat debatable.

Senator BUSH. Have you had a chance to read the so-called Rockefeller Brothers report, Mr. Gross?

Mr. GROSS. No, I haven't. I haven't read it. I have been thinking about what I was going to say when I came down here myself, and I didn't want to be swayed by it.

Senator BUSH. You are not familiar with that section of it which relates to the Defense Department?

Mr. GROSS. I haven't seen any part of it at all.

Senator BUSH. One of the parts of that report that does deal with the reorganization of the Defense Department puts a good deal of emphasis on the fact that we do not have a unified military command. It suggests that the Chief of Staff position should be elevated; that he should really, in effect, become the commander of the Armed Forces of the United States, and it speaks of general officers or flag-rank officers all becoming officers of the armed services of the United States, and leaving these different departments, so that they increase their objectivity, and so forth.

Would you care to comment on either one of those matters, on the unified command matter first?

Mr. GROSS. I would rather not, sir. I do not feel I am up on that, as I haven't read the report.

Senator BUSH. I think that is perfectly understandable.

I do not think I have any more questions.

Senator JOHNSON. Senator Stennis?

FULLY INFORMED PEOPLE WOULD PAY INCREASED TAXES

Senator STENNIS. Mr. Chairman, I am very much impressed with Mr. Gross' statement here. I think it is one of the clearest and best that we have had. Great strength is added to it by virtue of the fact that it represents a segment of industry that is so intimately connected with our problem and so vitally interested in how we are going to solve it. I do want to ask him a few questions though. I did get to hear all of Senator Bush's questions, but I think Mr. Gross sums up here on page 3 a very sound principle of government under our system that foreign policy must stem from the President of the United States as

the Chief Executive, and be concurred in by the Congress of the United States.

Then he speaks here :

We face a national crisis as grave as any in our history short of actual war. We have been too much concerned about balanced budgets, reduced taxes, and business as usual.

I think that is very true. But let's get down to specifics now, even at the expense of a little repetition. I am just wondering how we are going to finance this added military program that I think far exceeds in amount anything that has been mentioned by the administration yet.

If it does cost as much as the Rockefeller report says, 3 billion extra for this year and an additional 6 billion for the next and 9 billion then for the next, that is going to require an unbalanced budget or taxes.

Now what do you think? Are you willing to recommend an unbalanced budget or an increase in taxes now to really get started and anticipate this thing as it really looks, and then get started on a basis that will meet it taxationwise or budgetwise within the economy?

As an outstanding businessman and a very constructive manufacturer, are you willing to do that?

You see the crisis, I think.

Mr. GROSS. I think, Senator, that I declared myself when I was speaking to Senator Bush.

Senator STENNIS. I am sorry, I missed some of your answers there.

Mr. GROSS. But I sum it up this way: I think the people themselves, if they know the truth, are willing to buy the product and pay the bill, even if it means an increase in some taxes.

Senator STENNIS. I think so too, but are you willing to take the leadership, part of it, I mean, in coming out and recommending, now that this is in sight here, the need for these billions of dollars?

We might just as well get ready now?

Mr. GROSS. Yes, I am, provided it is coupled with a determination to simplify our process of spending the money and getting more for the dollar.

WE CAN GET MORE FOR OUR MONEY BY SIMPLIFYING WAY WE SPEND

Senator STENNIS. That is a very good point indeed, and it will take a lot of men besides you to come out and advocate this increase in taxes.

Mr. GROSS. I don't want one without the other.

Senator STENNIS. That is a very good point too, but I think that partly describes what we have been drifting into. We have been putting off and putting off and the system has not been improved as it should and we have delayed the time of spending this money.

It is kind of like balancing the budget in the Post Office Department. They don't want to increase the pay of the employees until we get the postage rates up, and we keep postponing, and I think we have got to meet this thing more head-on, and I appreciate very much your suggestions.

You do now advocate an increase in these expenditures and an increase in taxes to go with it to meet the needs?

Mr. GROSS. If they are necessary to do it.

Senator STENNIS. At the same time you want the improvement on the organization that will be more effective?

Mr. GROSS. Indeed, yes. I will even go further and say that I do not care what kind of money we appropriate for the budget, whether it is more or the same or less.

We can get more for our money if we simplify our process of spending it, whatever the budget is.

Senator STENNIS. Now just one other question.

You use the term here "business as usual." You think we have got to be less concerned with business as usual?

Where are we going to start? Who is going to make the first sacrifice? Where are we going to get started on some program other than business as usual?

Would you favor putting on controls, for instance, of wages and prices?

Mr. GROSS. No, I would not.

Senator STENNIS. Not now?

You don't think that is necessary now?

Mr. GROSS. I do not.

Senator STENNIS. If this problem does not get the proper attention though, we could come to that, could we not?

Mr. GROSS. We have had it in the past.

Senator STENNIS. We could be driven to it?

Mr. GROSS. Yes, sir, if we don't do it ourselves, we will be driven to it.

Senator STENNIS. That is the point I want to make, and if it drifts on and on, unless we meet the situation now, it could very well lead to wage and price control.

Do you think that is correct?

Mr. GROSS. It could, yes.

Senator STENNIS. Let me ask you one or two questions now about this matter that has concerned me more and more.

You mentioned the matter rather briefly. That is this conflict of interest statute that we have as applied to these very able men that come in the Government for civilian duties.

What do you suggest about that?

Do you have a concrete suggestion to make?

Should that statute be repealed or should it be modified or what do you think should be done?

AVOIDANCE OF CONFLICT OF INTEREST DRAWS IN INEXPERIENCED PEOPLE

Mr. GROSS. Well, I think it is absolutely fundamental that the problem ought to be faced up to realistically. I had a piece of paper 4 or 5 years ago that I thought did the trick and I was looking for it last night and I could not find it. But basically what I think is again that a man should not be penalized for coming into the Government service, and at the present time he is.

Not only that, but a second point. We have such a system of trying to be very sure that a gentleman who comes into Government does not have a vested interest that in the search for these people we have to rely on men who may not know anything about the problem. We cannot ask people to come down to Washington as experts in a particular

field as long as they have a vested interest in the problem that they are trying to solve.

This frequently means that you get somebody to solve the problem that has not had any experience with it.

Now this just seems to me to be wrong. I would like to see some basis worked out whereby men who were asked to come to Washington and agreed to come to Washington sort of put their lives in escrow, their economic position in escrow while they are here.

They don't gain anything out of it but they don't lose anything out of it.

Why isn't that fair? That is all I suggest, and I don't see why it can't be done.

Senator STENNIS. You do not what?

Mr. GROSS. I do not see why it cannot be done.

Senator STENNIS. Well, it is very difficult to get the right men to come. Most men of outstanding competence already have their roots in the ground and have vested interests, and very laudable, as they do. I think they come to stay only a short time, many of them, and that is natural, too. They cannot afford to come and stay except for a short time.

But to put it in black and white, it is very difficult to work out an additional statute, I have tried to do it, that would meet the ends and at the same time afford the protection. I have even thought of saying that if they had to be confirmed by the Senate, there would not be any statutory requirement, and put the burden on the Senate or the committees of satisfying themselves as to the situation as to the nominee. But that is kind of open at both ends.

If you could prepare a memorandum on that subject of how we could provide a method of putting these matters in escrow, as I think that is a good suggestion, I would be very glad and I am sure all of us would be very glad to have it, because you have touched on one of the vital exposed nerves of our system.

Thank you very much, Mr. Chairman.

Senator JOHNSON. Mr. Gross, if you will prepare that memorandum, without objection we will make it part of the committee record.

Mr. GROSS. I will look for my paper.

FEBRUARY 5, 1958.

HON. LYNDON JOHNSON,
*Senate Preparedness Subcommittee,
Washington, D. C.*

DEAR SENATOR JOHNSON: During my recent appearance before your committee on January 15, the matter of so-called businessman's conflict-of-interest issue came up, and in the course of the discussion which followed you requested me to submit any ideas I might have which might be the basis for either legislation or executive directives in this troublesome area.

The problem is not a new one and in my mind it contributes to some of the irritations and delays that we have experienced during the last few years. One of the most often-heard criticisms of the role of the so-called businessman in government is the fact that too often when they are appointed to some position they rather reluctantly agree to serve for relatively short periods, sometimes as brief as a year. I think it is the exception rather than the rule when a businessman of substantial stature and experience actually serves more than 2 or 3 years.

This brings about the state of affairs whereby a man from private life needs a few months in which to become indoctrinated, not only in his job but in the

complexities of the Washington scene. He then only has a few months of genuine productive service before he begins looking at the clock, so to speak, and wondering when he can get back into private life.

The result is a lack of continuity, rapid turnover, and imposition of a tremendous burden upon the Armed Services and the other Government departments who are expected to educate their new civilian superior only to find him ready to leave all too soon. This constant period of educating is time-consuming and must be frustrating to the permanent staffs of our Government.

The answer to me is quite obvious. The conditions of government service have been made so burdensome and severe by the conflict-of-interest policy that now exists that very few business people or men in private life can afford the personal sacrifices in one way or another that are now involved. This does not mean to say that a true American businessman should not be prepared to make certain sacrifices for government. Quite obviously we must assume that the ordinary American is a patriotic individual and, therefore, we must assume that he does not expect to be rewarded for his government service; on the other hand, he certainly should not be penalized.

I think as matters now stand, in most circumstances the man giving up his private life and going to Washington does find his life penalized and, consequently, some of the most capable individuals are not available or if they are, are available for such a short time as to make their service less valuable than it otherwise might be.

It is against this background and with the hope that something might be done to improve this situation that I advance, for what they are worth, the following thoughts:

1. I would suggest that before the actual induction of an individual into the kind of positions under discussion the appointee should be required to submit a list of all of his personal holdings and property to the Secretary of the Treasury. The Secretary would have the sole authority to designate which holdings in the circumstances would be deemed to be "blocked" securities and who, if any, would be deemed to be the appointee's prime employer.

By "blocked" securities I mean securities of companies who would be doing a significant amount of business with the department or departments with which the appointee would be connected and, hence, might constitute a conflict of interests. The Secretary of the Treasury would have to exercise judgment as to whether a security is "blocked" or not, and it is entirely possible that a security would be deemed to be "blocked" in connection with the appointment of one individual, whereas the same security might not be deemed to be "blocked" in another appointment.

For example, let us suppose that an individual were to be appointed to an important position at the secretarial level or just beneath it in the Department of Agriculture. Suppose also that this same individual had holdings of, say, International Harvester stock. I would consider that in this case International Harvester stock would be deemed to be "blocked."

But suppose an individual were to be appointed Under Secretary of the Air Force or an Assistant Secretary of the Air Force, for example, and owned International Harvester stock. In this instance I would consider it not to be "blocked" because obviously the International Harvester Co. does a very insignificant amount, if any, business with the Air Force and is not in the aviation business at all.

2. The appointee would then have the option to: (a) sell the "blocked" securities before taking office, or (b) to retain them. If the appointee elected to retain the "blocked" securities he must agree that:

(1) He must deposit the "blocked" securities with the Secretary of the Treasury under a suitable and adequate receipt.

(2) He must agree under severe penalty that during the tenure of office he would neither add to nor sell any of the "blocked" securities. In other words, no matter in what manner or to what degree his actions during his tenure of office effected the operations of the "blocked" security companies, he would neither be able to add to his holdings if an attractive posture were created nor dispose of any of them if an adverse posture developed. The appointee would be entitled under this option to receive dividends or interest on the "blocked" securities and in consideration of his fixed and immovable position (i. e. the inability to protect himself by either sales or purchases) he would receive a 40 percent reduction of any Federal taxes that he paid upon his "blocked" securities income.

3. If the appointee, on the other hand, elected the first option; namely, to dispose of his "blocked" securities before induction into office, his prime employer (to be designated by the Secretary of the Treasury) could if it so desired pay him not to exceed 40 percent of his stipend and on this 40 percent he would be entitled to receive in turn a reduction of 40 percent in taxes.

4. The appointee must resign from all boards of companies whose stock is designated as "blocked."

5. Upon his death the "blocked" securities would be immediately returned to his estate or designee.

6. Any "blocked" securities would remain blocked and in the custody of the Secretary of the Treasury for 4 months after his resignation or the termination of his assignment.

Perhaps a few observations of a general nature will be appropriate. The intent of the foregoing options is to provide an appointee with one of two broad courses: Either he may elect to deliver his blocked securities to the Government and remain in status quo with respect to them during his period of office and receive the income from them on which he might live; or if he decides to sell his blocked securities and forfeit the income involved and pay the heavy taxes that undoubtedly would accompany such sale, then he might enjoy the benefits of at least a partial stipend (40 percent) from his prime employer which, when added to the salary that would undoubtedly accompany his Government position, would allow him to live comfortably though not necessarily according to his accustomed standards.

This option whereby the appointee would be entitled to receive a stipend from his prime employer is also designed to relieve the circumstances wherein an experienced and desirable executive might have a large salary and yet have a very small list of securities. There are many instances in American business where executives receive large salaries but for one reason or another are not able to accumulate securities as well. In such a case then an appointee, faced with the prospect of serving in Washington under present circumstances, would have to sacrifice his salary, the only significant asset he has, and receive in return the very modest stipend that Government positions carry. Under the option suggested herein he could at least expect to receive 40 percent of his stipend and further would receive some relief (40 percent) of the taxes thereon.

Undoubtedly there are many variations and refinements that could be made to the foregoing suggestions. For example, it might be desirable to give an appointee a combination option of (a) and (b) whereby he could dispose of part of his blocked securities and retain the rest, the part that he retained, of course, being blocked and would therefore be subject to the blocked conditions set forth above.

At any rate this suggestion may prove thought-provoking. I believe that it would be a step in the right direction, and almost any alleviation of the present situation would be an improvement which I think will inure to the benefit of the Government and the people. The people and the Government have a right to expect—and they certainly deserve—superior performance in these trying and difficult times and any conditions that we can set up that would be inclined to make high performance and superior service readily available to our Government, I think, would be desirable.

Respectfully yours,

ROBERT E. GROSS,
Chairman of the Board.

REPROGRAMING OF MILITARY PROJECTS VERY COSTLY

Senator JOHNSON. Senator Symington.

Senator SYMINGTON. Mr. Gross, I congratulate you on your statement. You have been manufacturing a long time, have you not?

Mr. Gross. Yes, sir, 25 years.

Senator SYMINGTON. And if you had to reprogram your line of merchandise in private industry—if you had to make major changes in your tooling and in your production line several times a year, you would use up all your profits, would you not?

Mr. GROSS. Yes, it would certainly have a deleterious effect on it, certainly.

Senator SYMINGTON. And in the military you have a vast amount of reprogramming because of lack of control of what you term the product, is that correct?

Mr. GROSS. Well, we certainly have had a tremendous amount of reprogramming, yes, and I feel it gets back to the fundamentals that we are talking about here.

Senator SYMINGTON. And you also have a lot of plant reprogramming due to changes in the military programs, for example, in the number of wings? You go up and you go down as the military programs themselves go up and down, is that correct?

Mr. GROSS. Yes, certainly.

Senator SYMINGTON. There is talk about money not being important, but we are always at the same time talking about money.

For example, the administration is now coming up with a \$910 million supplemental for the Air Force, which, as a matter of passing interest, provides for not one airplane of any kind. Some people in this body feel that a billion dollars more should be appropriated for the Air Force.

Other people think that there should be \$2 billion more for defense. The Rockefeller report talks about \$3 billion more annually.

We understand that the classified Gaither report talks about \$8 billion. One of our colleagues believes we should increase defense expenditures another 5 percent of the gross national product, which would still leave us substantially below the estimated Russian percentage of 25 percent of their gross national product for military purposes. If we added 5 percent of our gross national product, that would be about \$21 billion more.

Now, suppose you approached this thing from an entirely different angle. Based on this excellent page 3 of your statement, suppose you decided first what is the danger, what is it that we face and why, based on the national intelligence and all other types of intelligence; and, second, you then set up long-term plans to try to get what you thought was necessary to meet that danger, regardless of the money involved, I am one that thinks that a balanced budget is important, but national security is more important. Third, you set up the organizations and procedures to get what you needed on the basis of maximum efficiency and minimum cost.

My question would be: Do you not think in the long run, it we would approach it that way and have a clear-cut overall national policy, that we would end up actually spending a great deal less of the taxpayers' money for an adequate system than we do now for an inadequate system?

NO. 1—ASSESS THE DANGER; NO. 2—PLAN TO MEET IT

Mr. GROSS. There are a great many elements in your observation, Senator. There is very little of it with which I could disagree. In fact, in principle I agree with exactly what you say. I feel we could get more for any budget we have if we simplify our organization. I think the first thing we have to do is assess the danger. Then I think

we have to get a plan. Then I think we have got to find the bill and then I think we have got to pay for it.

Senator SYMINGTON. I think that is exactly what I asked you. We are in complete agreement are we not?

Mr. GROSS. Yes, sir.

Senator SYMINGTON. The Air Force budget for the fiscal year 1957 was \$17.7 billion. And recognizing the grave increased growth of the Communists in the fiscal year 1958, the Air Force budget was cut to \$16.8 billion, and then sputnik came up and so there is a request to add \$910 million, so the Air Force budget request is for the fiscal year 1958 exactly what it was for the fiscal year 1957, \$17.7 billion, which, of course, does not take into regard any diminution in the value of the dollar.

Then we have sputnik and now we are having hearings in this body and hearings in the House and speeches by the President. It sounds as if we are going to do something, something big. So the fiscal year 1959 budget for the Air Force is \$18 billion, which is considerably less than 2 percent more than the 1957 budget or the 1958 budget with the supplemental. We have done something in increasing the amount of money for missiles, but on the other hand, if we do that and, in effect, keep the same budget in the fiscal year 1959, are we not doing it at the expense of our forces in being—our bombers, our fighters, our tankers, our airlift, and so forth?

Otherwise there would be no way of doing it, especially as the dollar continues to decline in value. Is that not true?

A "TRAGEDY" TO DETRACT FROM FORCE IN BEING

Mr. GROSS. Yes. In the early part of my statement, Senator, I alluded to this problem of trying to keep a rational and a reasonable and a safe balance between these exotic vehicles, the missiles, and the manned airplane, and I would hope very much, although I am not a military expert, but I would hope very much that we would do nothing here to downgrade or reduce our force in being, and particularly our Strategic Air Command. I think it would be a tragedy if we did anything, if we took money away from that to go into other things.

Senator SYMINGTON. I understand that, and I have read your statement quite carefully. I am sorry I was not here when you gave it.

If you will remember, in 1953 \$7 billion was cut out of the military services, of which \$5 billion came out of the Air Force, and we were told we were going to get a better Air Force. Senator Russell said, "Why do you not cut \$10 billion and get a much better Air Force"? Some more was cut in 1954, 1955, and 1956.

In 1957 some was put back in and in 1958 some more was cut out. How can we have more money going into missiles at this time with, in effect, the same budget amount, unless we do it at the expense of the forces in being? It does not add up.

Mr. GROSS. Yes.

Senator SYMINGTON. I remember you used to be pretty good at figures. Is that correct, as you see it?

Mr. GROSS. Yes, sir, it is.

Senator SYMINGTON. Now, I just want to get back to this programing business. Last year a budget was presented by the administration, \$38.5 billion, and then the administration itself cut \$500 million out

of that, leaving \$38 billion. Then the House cut \$2.6 billion out of that and the President went on the air to the people and said he would accept \$1.4 billion of the cut, but he had to have \$1.2 billion because if he did not, it would be dangerous to the security of the country. So, in the Senate, we got back \$971 million of that. When we went into conference with the House, the Director of the Bureau of the Budget and the then Secretary of Defense sent word over to the conference that they did not need much of that money after all.

So we got \$197 million instead of the \$971 million, and that was approved.

Now, my point, is aside from the question of not putting enough into military defense, each time such actions are taken, there is a re-programming effort that they have to go through in the Pentagon.

Mr. GROSS. Sure.

PROGRAM CHANGES CREATE "TURMOIL FOR EVERYBODY"

Senator SYMINGTON. And it is all very well to criticize the military, but on the other hand, I remember one year when General LeMay was running research and development. He came to me and he said: "We have done absolutely nothing this year but reprogram. We have done no research and no development, and therefore we have got to find some way across the river for the Congress and the administration to handle that if we want to get any efficiency."

Do you not agree?

Mr. GROSS. Yes. And from the administration standpoint, we are at the end of this rope and we are the victim of these exercises that go on all the time, and sometimes we do not know where we stand. The military people have to make these exercises because they are requested to do so and required to do so by these fiscal problems. I don't think they want to do it, but it makes a tremendous problem for us. One day we hear something is going to be cut back, stretched out, terminated, increased, and it creates a turmoil for everybody.

Senator SYMINGTON. I have been on the other side as a manufacturer attempting to operate under the situation that you describe.

On the other hand, I have had as many as 10 different governmental agencies, including congressional committees, in a plant investigating at one time to see what was going on, to see whether the paperwork was being handled properly. With all due respect to the military and they have a lot of faults, but it is the system itself which has to be corrected; is it not?

Mr. GROSS. Yes.

Senator SYMINGTON. Did you see the chart that Mr. Trevor Gardner put in Life magazine on research and development?

Mr. GROSS. No, I did not, but I have seen other charts. Oh, the one where he made his recommendations?

Senator SYMINGTON. He had two charts.

Mr. GROSS. Yes.

Senator SYMINGTON. In one he stated the problem and the second was an effort to solve it.

Mr. GROSS. Yes.

Senator SYMINGTON. Do you agree that that in general takes care of much of what we are talking about this morning?

Mr. GROSS. Well, it was certainly a step in the right direction.

Senator SYMINGTON. Thank you, Mr. Gross.

Mr. CHAIRMAN. I have no further questions.

Senator JOHNSON. If all Senators have concluded their questioning, counsel, do you have any more questions in open session?

Mr. WEISL. Not in open session. I have some in closed session.

Senator JOHNSON. Then if it is agreeable, the committee will go into executive session.

We will take a 3-minute recess.

(Whereupon, at 11:15 a. m., a short recess was taken, following which the committee went into closed session.)

AFTERNOON SESSION

Senator STENNIS (presiding). The committee will please come to order.

Mr. Kimball, before you sit down, in keeping with the rest of the witnesses, will you hold up your right hand to be sworn. Do you solemnly swear that your testimony here before this subcommittee will be the truth, the whole truth, and nothing but the truth so help you God?

Mr. KIMBALL. I do.

Senator STENNIS. Have a seat.

TESTIMONY OF DAN A. KIMBALL, PRESIDENT, AEROJET GENERAL CORP.

Senator STENNIS. Mr. Kimball, I will read here briefly from your biography which we will want to have inserted in the record.

Dan A. Kimball was born in St. Louis, Mo., on March 1, 1896. He became a Los Angeles manager of the General Tire & Rubber Co. in 1920, and a vice president of the company in 1942. He has been a director and executive vice president of the subsidiary company, Aerojet Engineering Corp., since 1944. He served with the Army Air Corps in World War I.

He was appointed Assistant Secretary of the Navy for Air in March 1949, Under Secretary of the Navy in 1949 through 1951, and Secretary of the Navy from 1951 to 1953.

He became president of Aerojet General Corp. in 1953.

Mr. Kimball, we are very glad to have you here today indeed as a witness. I along with many others remember you very vividly when you were Secretary of the Navy and remember the testimony when you were before the committee and remember the contribution you made at that time here in Washington.

We are doubly glad to have you here. Do you have a prepared statement?

Mr. KIMBALL. No, Mr. Chairman, I do not. I thought I would just—

Senator STENNIS. All right. If you wish to make a statement, you may do so now. If not, the order of procedure will be for Mr. Vance, the assistant counsel for the committee, to ask you questions.

Mr. KIMBALL. I have no statement, Mr. Chairman, and I would be very happy to answer any questions I can.

Senator STENNIS. All right, Mr. Vance, you may proceed.

AEROJET WORKING ON PROPULSION FOR TITAN AND POLARIS

Mr. VANCE. Mr. Kimball, your company is engaged in the development and production of the propulsion system for a number of missiles, is it not?

Mr. KIMBALL. That is correct.

Mr. VANCE. And two of those missiles are the Titan and the Polaris, are they not?

Mr. KIMBALL. That is right.

Mr. VANCE. Now, first, with respect to the Titan, has the Titan program been speeded up insofar as your participation in it is concerned?

Mr. KIMBALL. Well, the development program has gone pretty well on schedule. It was slowed down slightly when we had to put some limitations on overtime. But——

Mr. VANCE. When was that, sir?

Mr. KIMBALL. They put some limitations on overtime last fall, but those have been removed since then. The development program has gone along, I think, quite well. As a matter of fact, we are ready to deliver engines. The production of the engines has not been speeded up.

Mr. VANCE. In your opinion, can the production of the engines be speeded up?

Mr. KIMBALL. Oh, yes, we could make many times what we are now scheduled to make. But if we are to make them, if we are to speed it up, we must know somewhat in advance. You cannot turn production on and off like a spigot. If you are going to get more of these engines for this program, it takes considerable lead time. It will take you 6 months to a year of lead time to speed such a program up.

So if you are to have more engines this fall, we have got to know now.

Mr. VANCE. In your judgment, should the program be speeded up?

Mr. KIMBALL. Yes, I think they should speed it up.

Mr. VANCE. And you need to know right now if you are going to speed it up?

Mr. KIMBALL. We have no knowledge that they are going to speed it up; no.

Mr. VANCE. But my question was: It would be important to know at this time, as soon as possible?

Mr. KIMBALL. It would be extremely important.

Mr. VANCE. To accelerate it?

Mr. KIMBALL. Because if we are going to speed this thing up this fall, we have to know now, because the lead time is considerable.

PROCUREMENT OF INDUSTRY FACILITIES A BOTTLENECK

Mr. VANCE. Mr. Kimball, we wrote to your company and asked certain questions, and one of the questions was what were the bottlenecks holding up the program on which your company was working. One of your answers reads as follows and I would like to read it to you and I would like you to comment on it and ask you to amplify:

In early phases of program, procurement of requisite industrial facilities was pacing. Cumbersome and complicated procedures covering this vital area caused delays and inefficient use of skilled manpower. At the present time, this problem is not as critical as it was during the early phases of the program but still

warrants attention. Regulations still exist and, if anything, procurement of industrial facilities is more difficult and time-consuming. Hence, other programs will suffer from this same reason. This is considered by this contractor to be a serious problem for which positive action towards a solution is required.

First I would like to ask you what you meant by the word "pacing" in the first sentence. It reads: "In early phases of the program, procurement of requisite facilities was pacing."

Mr. KIMBALL. Well, if you don't get the facilities necessary to do the testing and the development and the manufacturing, you cannot get very much done. In other words, we cannot test rockets, large size rockets or any size rockets, unless we have test stands to test them on and unless you have places to fire them from. When they start on a program of research and development, you can get a contract reasonably fast to do the development work. But then when you say we have to have certain facilities to do this testing, you run into problems, even though they have agreed with you in principle that you are going to have the facilities, for every little piece of them, you have to go through a very cumbersome procedure on.

Now, the contracting people tell me that one reason it is so difficult is under your public law, I think 413, that gives them certain regulations they have to work under. In every case, getting facilities started and getting them in being is the thing that delays the start of the program. Because until, we cannot fire these engines on test stands, until we have the test stands.

So before you really need the test stands, you really need the engines. In our case, in the Titan program we knew the authority was going to come through for it, so in our case we went ahead to spend our money, figuring they would cover us later on. Mostly they did, but in some cases they did not.

Mr. VANCE. I understand when you said it was pacing, you meant it was not going forward.

Mr. KIMBALL. That is correct, that would determine how fast it would go.

Mr. VANCE. May I ask you specifically what changes do you think should be made in Public Law 413 in order to do away with this serious problem?

PLEA FOR AUTHORITY IN CONTRACTING OFFICER TO MAKE DECISIONS

Mr. KIMBALL. Well, I don't have the details of the law with me, but I would say that if you have agreed on a program, that you give the authority to the contracting officer that is working on the job with you and let him make on-the-spot decisions.

Many times now, if you want certain facilities, then you have to go to the agency that is making decisions and they have to come back to Washington to get answers.

Now, in the case of the Titan, they did not. The Air Force set up the Ballistic Missile Division and we got a little better service, I may say, than if you have to come back to Washington for answer, because you did not have to go through so many different echelons. But even at that, it was quite time consuming.

Now, on the Polaris program they have speeded it up pretty well. We have gotten authority, and we told them specifically what we needed to start with and they have gotten the authority pretty rapidly.

Mr. VANCE. I wonder if you would be willing to supply for the record specifically what changes you think should be made in Public Law 413 in order to—

Mr. KIMBALL. I would be very happy to.

Mr. VANCE (continuing). In order to do away with the problem.

Senator SALTONSTALL. Could you tell us in detail—maybe I missed it—what is Public Law 413?

Mr. VANCE. Would you like to answer that question?

Mr. KIMBALL. I have not got a copy of the law, Senator. I cannot tell you exactly except our fellows keep coming back and saying one reason that the contracting officers say they cannot approve these changes, cannot approve the work faster, is that they are bound by Public Law 413.

Senator SALTONSTALL. Well, maybe Public Law 413 is the profit law back in 1947; is that the law?

Mr. KIMBALL. I have not got the details in it, but I will get you the details and supply them for the record.

Mr. VANCE. I believe that is correct, sir.

Senator STENNIS. All right. Proceed, Counsel.

PROPULSION SYSTEM FOR POLARIS PROCEEDING AHEAD OF SCHEDULE

Mr. VANCE. Now, with respect to the Polaris program which you just mentioned, can that be speeded up, in your opinion?

Mr. KIMBALL. Well, the development program is coming along quite well. As a matter of fact, we are a year or so ahead of where we thought a year ago we might be today. We are firing the propulsion system quite regularly. The performance is all right.

But if we are going to get into any substantial production at the end of this year or next year, we have got to start to get ready now. We cannot wait until the middle of 1959 and then say: "We want five times the number of missiles in 1960 that you are now capable of turning out." You have to have a lead time on such production if you are going to get such production.

We know now as far as the Titan and the Polaris are concerned and I can speak for them, these are going to work. We have the powerplants that will work, so you are going to have the missile working. Now, how many do they want? If they want 1 or 2 a month, that is one thing. If they want 15, 20, 30 a month, that is a different order of magnitude.

Mr. VANCE. When do you have to know?

Mr. KIMBALL. We have to know a year ahead of when you want them.

Mr. VANCE. And you have not had notice at this time?

Mr. KIMBALL. If they tell us now what production they want in 1959, we can get it for them, but if they wait until 1959, we cannot get it for them.

Mr. VANCE. Have you received any notice at this point to accelerate?

Mr. KIMBALL. They had one acceleration on the Polaris program and, in my opinion, it has not been enough. The numbers we are scheduled to turn out, in my opinion, will not fulfill what they need.

Mr. VANCE. Now, I would like to ask you a general question, Mr. Kimball. You have had great experience, both in industry and as

Secretary of the Navy and Under Secretary of the Navy, and I would like to ask you what recommendations you would make for accelerating our military program?

Mr. KIMBALL. That is a pretty broad question.

Mr. VANCE. Yes, sir.

Mr. KIMBALL. I think you have got to know first what you want to make now. This country is in a very difficult position, as I see it, at the minute. We are starting to make long-range missiles. Now, we cannot pass up the forces we now have in being and depend on those missiles until we have them in being, so that for the next 2 to 10 years we are going to have to have a duplication of effort. We are going to have to keep the forces in being that we have and work to the new advanced things we are going to have so that is going to cause us some duplication.

Now, we have to think way ahead in this business. We are now talking about intercontinental ballistic missiles and intermediate range ballistic missiles. In my opinion, we should have started before on this. We did not. We started on them in late 1954 or late 1955, and they will start coming into being and into production and operational use at the end of this year and over the next 2 or 3 years.

I think we have got to think further ahead than that as to what missiles we are going to use in the future. It is not a question, I think, of whether we are going to have space travel or have satellites and satellite missiles. I think we know we have to have them, so I think we have to start planning for them and doing the research and development to prove those things out.

THE IDEA FOR A NEW MISSILE MUST AWAIT OPERATIONAL REQUIREMENT

I might say, one thing that is quite hard in the military is to get any ideas started, it is very difficult to establish operational requirements for new missiles. The standard answer over there if you have something new, they said, "Well, we do not have an operational requirement for it," so that stops you completely. And that is the reason I think a scientific advisory body such as Dr. Killian has headed up should be pointing the way to new things in weapons we are going to need next year and 5 years from now and 10 years from now and developing the hardware that is needed for them.

Mr. VANCE. Are there any other suggestions you would have for expediting that aspect of the program?

Mr. KIMBALL. Well, I think you have to have some forward-looking people in the military and in the scientific field to suggest those things. I think personally one thing that might help a little bit would be to simplify the structure of the Defense Department. I would not want to change the military system as it is now. I think the Joint Chiefs are a pretty good working operation, but I think you have entirely too many layers of civilians over them that have the power of veto and not the power of action.

Mr. VANCE. How would you correct that?

Mr. KIMBALL. I would get rid of about three-quarters of the people in the Defense Department. Maybe that is not enough. Maybe it should be 90 percent. And let them set the policy and not do the operation. The military people are perfectly capable of operating. They

do a fine job of it. You do not have to have one civilian to look over the shoulder of every person in uniform. You just slow them up when you do that.

Mr. VANCE. How do you account for the growth of these layers of committees, and so forth, which has come into being?

Mr. KIMBALL. Well, I cannot account really for it because it seems like every time they run into a problem, they set up another committee to handle it, and most of those committees do not have the power of action. They have the power of veto but they do not tell you to get going on something.

I served on the research and development committee over there for 2 years and one scientist used to say it was the retardation and delay board.

Mr. VANCE. Then do I correctly understand you that you feel that the policymaking group should be cut down in number and that the decisions should be made quickly and given to the military to carry out from an operating standpoint?

Mr. KIMBALL. Let them do it and see that they do it rapidly.

Mr. VANCE. Have you any other suggestion with respect to possible acceleration of the program?

Mr. KIMBALL. Well, I do not believe so.

Mr. VANCE. Mr. Kimball, I believe that you made a speech to the American Rocket Society on December 18, 1957. The paper quotes you as saying that the Director of Guided Missiles should be appointed by the President and confirmed by the Senate for a specific period of years. He should work for the Secretary of Defense.

Mr. KIMBALL. That is correct.

"MISSILE CZAR" SHOULD NOT HAVE INDEPENDENT BUDGET

Mr. VANCE. Would you explain what you had in mind there?

Mr. KIMBALL. Well, I think when you put a person in that position of great responsibility, I think you should give him some statutory authority, and I think the Senate should have the opportunity to pass on it. The way it is now, the heads of these committees come and go. I think we have got to give the man authority to tell the military what to do and to support their budget. I do not think he should have a separate budget. I think he has got to support the budget for the military services.

Mr. VANCE. Are you suggesting there what is sometimes referred to as a missile czar?

Mr. KIMBALL. You can call it that, yes.

Mr. VANCE. Now, in your view, what should be the relationship of the so-called missile czar to the Secretary of Defense?

Mr. KIMBALL. He must work for the Secretary of Defense. He must work under the Secretary of Defense.

Mr. VANCE. And take his direction from the Secretary of Defense?

Mr. KIMBALL. Certainly.

Mr. VANCE. What should be the relationship of this man to the military services?

Mr. KIMBALL. It seems to me he has got to take the ideas that they want to translate into missiles and let them do it and suggest new and better weapons that they should make, but it should be a policymaking

job, and not an operating job and it should be augmented by only a small staff. If you get a big staff under such a person, then the staff does the work and they make the opinions that they are not capable of making.

And, incidentally, if the staff does not want what you are proposing to go through, they just do not give the fellow in charge the paper on it.

Mr. VANCE. Well, specifically, should this man have the power to say go ahead and build a certain missile or stop building another missile? Just what power should he have?

Mr. KIMBALL. He should have the power to start new weapons and to stop the ones, in his opinion, that are not feasible.

One of the things you have to do in the military when you are getting advanced weapons, you have also got to stop some of the things they are doing that are not going to be too useful. We have only so much money we can spend. I think the military should get any amount of money that is necessary, but you certainly are not going to keep on making bows and arrows. You have to make advanced weapons.

And when some of the weapons get obsolete or obsolescent, they should be stopped.

Mr. VANCE. What control, in your view, should this so-called missile czar have with respect to funds?

Mr. KIMBALL. He should support the funds that the military need to do their job.

Mr. VANCE. Should he be able to tell the military how much they should spend on a particular missile project?

Mr. KIMBALL. I would think his job should be in the nature of making them move faster rather than keeping them from moving as fast as they want to move.

BELIEVES DIRECTOR OF MISSILES SHOULD STAY OUT OF OPERATIONS

Mr. VANCE. Do we not have a missile czar now?

Mr. KIMBALL. They have a Director of Guided Missiles, yes, sir.

Mr. VANCE. And does he have the authority, in your view, which you have just described that he should have?

Mr. KIMBALL. I do not believe he has enough authority, no. And I am afraid he gets too much into the operations on the thing. I think he should pass on the feasibility of the project and support it with money, but he should not tell them how to do the work. That is one of the things that I worry about.

Mr. VANCE. This morning, Mr. Gross said that a stumbling block in getting people to come down and work with the Government was the conflict of interest statute. I believe you were here when he testified. Do you have any comment you would like to make on that subject?

Mr. KIMBALL. Well, I certainly do. I think the conflict of interest laws, the way they are being interpreted, is keeping people from coming down here. I do not think a man is going to be more or less honest because he has to sell some of his stock.

I happen to remember, having been confirmed by the Senate Armed Services Committee three times, that I started off on one premise. I remember they asked if any interest I had would stop me from doing

what I thought would be my duty, and I suggested what I intended to do was to issue orders that no matters relating to the company that I was formerly associated with, should ever be brought to my attention.

And I gave them a statement when I came in the Government, a financial statement, and I gave them one when I left. I think that is sufficient. I do not think the fact that you have sold some stock in a company is going to change your feeling about that company. A man who has spent many years with it, has to believe in it.

Now, at the same time a man should not have anything to do with any contractual relationships with that company after he is in the Government.

Mr. VANCE. Do you have any specific suggestions as to what should be done further than what you have already said?

Mr. KIMBALL. No. I think if you make it so difficult for people to come in the Government, you are not going to get the good people that you need because they will have to give up so many things that you are not going to get the right kind of people in here.

Mr. VANCE. Mr. Chairman, that is all the questions I have.

Senator STENNIS. Thank you, Counsel.

IF RUSSIANS GET MISSILES FIRST, "WE ARE IN MORTAL DANGER"

Mr. Kimball, I have just a few questions. You think that there should be a Director of Guided Missiles with more authority and even some statutory authority. Now, that means, as I understand your testimony, that you think this missile program is so important, so urgent, that it should be picked up and given this special impetus and special attention; is that correct?

Mr. KIMBALL. Yes, sir, I certainly think that because I think if the Russians get these missiles before we do, we are in mortal danger.

Senator STENNIS. Well, I certainly agree with you there.

Now, with that as a premise, why would not you give him authority to really make decisions and then deliver the materiel and the money to carry out those decisions? If it is so important as you say, why subordinate it, after all, to a Cabinet officer and the Budget Bureau?

Mr. KIMBALL. Well, if he is going to have to do all the work, he is going to have to set up staffs of people. He is going to have to set up manufacturing facilities, procurement facilities, development facilities. All of those things are now in being in the military's hands.

Senator STENNIS. I am not an expert on this, you are the expert, but I am just trying to probe your mind. Could not he be Director of Missiles and make this decision, as you say, about what missile would be built, and then turn that over to the Air Force for the building and the operational phases, as you say?

Mr. KIMBALL. Well, I think he is going to have to get the idea—

Senator STENNIS. Without having a big staff of his own, I mean.

Mr. KIMBALL. I think he is going to have to get the ideas from the military on the thing they want to build and he is going to have to supply the additional ideas on what they will build and he is going to have to urge them.

Senator STENNIS. Someone has got to provide the money, and assuming Congress has already voted the money or appropriated it, someone has got to let them have the money.

Mr. KIMBALL. Of course.

COULD NOT HAVE AUTHORITY OVER BUDGET BUREAU

Senator STENNIS. Why should not he have the authority? If he is going to have the authority as to what missiles are going to be built, in your judgment, and these programs, why should it not be his decision, this be subject to a veto of anyone except the President, of course? Why should he not have authority over the Budget Bureau and over the Secretary of Defense, even, if necessary?

Mr. KIMBALL. Well, Mr. Chairman, I do not know how you would give him authority over the Bureau of the Budget because that authority is the President's.

Senator STENNIS. I mean after you have given him the authority to use the money. He has ordered this missile to be built, this Director of Missiles; it is an urgent and special program.

Mr. KIMBALL. It would have to come to the Congress to get the money.

Senator STENNIS. I say assuming the appropriated funds are available, still under the present system the director of the budget can stop that missile program.

Mr. KIMBALL. That is correct, sir.

Senator STENNIS. That is correct. That should not be true, should it?

Mr. KIMBALL. No, sir, in my opinion.

Senator STENNIS. All right; why not give this Director of Missiles the authority to deliver the money and the materials?

Mr. KIMBALL. I would like to speak to that point, if I may.

Senator STENNIS. Certainly.

Mr. KIMBALL. You get the money now, the Defense Department and the military services make their budget and then it is screened by the Bureau section in the Defense Department and then it is screened by the Bureau of the Budget, so your money is in jeopardy three times before you get it. But then when the reverse procedure comes along after the Congress has appropriated the money, the services do not get that money, as it has to be screened again on the way down by the Director of the Budget and if the Director of the Budget does not want to give the services the money that has been appropriated to them there is nothing they can do about it.

Senator STENNIS. That is what I am trying to get to now.

This man you would clothe with authority to make the decision as to which missile would be built and which one would be made operational, I see where he can be blocked now by the Secretary of Defense, and can be stopped by the Director of the Bureau of the Budget even though the money has already been appropriated by the Congress.

Mr. KIMBALL. That is right.

BUDGET BUREAU SHOULD NOT HAVE POWER TO WITHHOLD APPROPRIATED MONEY

Senator STENNIS. If you are really going to get results, if the Director of Missiles is going to get results under this program he would have to have authority to say that that money shall be spent, would he not?

Mr. KIMBALL. It would seem to me so.

Senator STENNIS. Yes. Well, I say why not in this statutory authority, why not give it to them?

Mr. KIMBALL. After the Congress has appropriated the money I think he should be allowed to use it.

Senator STENNIS. After Congress has appropriated the money?

Mr. KIMBALL. Yes, sir.

Senator STENNIS. Assuming always he is under the orders of the Commander in Chief, the chief of the executive branch, and assuming always that Congress has to appropriate the money.

So you think this Director of Guided Missiles should be created and should have this authority then?

Mr. KIMBALL. Yes, sir.

Senator STENNIS. To get the material and the money even at the expense of going over the head of the Director of the Budget, if necessary?

Mr. KIMBALL. Well, I do not see how—I never have been able to see how, after Congress appropriates the money, that the Director of the Budget should have the power to stop it.

Senator STENNIS. Well, he does have it, we agreed to that.

Mr. KIMBALL. He certainly has.

Senator STENNIS. And we have many instances here where money has been held up. I just want to be able to understand: You make a flat recommendation saying the Director of Missiles have the authority to say what missile program would be in operation and assuming that when the sum of money has been appropriated how it should be spent?

Mr. KIMBALL. Yes, sir.

Senator STENNIS. I thank you; you have made a contribution here.

May I ask you this. You speak of the number of groups within the Government who have the power to say no or the negative veto.

Senator Bush, I think, has described it as being layer upon layer of these authorities.

Why, as an experienced officer in the Government, why did that situation develop?

What caused this situation to grow up as it is now?

Could you give an idea on that? I am not dealing in personalities, I am talking about the system.

Mr. KIMBALL. I cannot tell you how the thing——

FEAR OF MAKING DECISIONS LEADS TO GROWTH OF COMMITTEES

Senator STENNIS. Well, was it overcaution?

Mr. KIMBALL. I think it comes from overcaution. Everybody says, "We have a problem. Let's set up another committee, let's set up some more people on the staff to handle it," and pretty soon the staff that should be in a policymaking group of maybe 5 or 10 people, gets to be several hundred or several thousand, and nobody ever seems to cut them back.

Senator STENNIS. Some witness before the committee said that somewhere along the line someone had to stick his neck out.

Now that is something maybe few like to do. I am not saying that the Members of the Senate want to stick their necks out but wasn't

he about right about this, that someone has got to take the responsibility of making a decision and taking a chance on its being wrong?

Mr. KIMBALL. It is one of the real troubles in government and in the military that when you start to write contracts they always say, "Well, now, we have got to be doubly careful. We have to wait and have to protect ourselves so when they have a congressional investigation everything will be in order."

Now, in a business you do not run it that way.

In a business, you have a meeting with 2 or 3 people and say we are going to do this and you start doing this right now, and then you can call up a fellow and say, "You can have this job; go ahead and go to work."

Unless it is an extreme urgency they don't do it in the military, and they can do it.

If they feel there is a real urgency, we have had approvals come through in 48 hours, but mostly they take 6 to 12 months.

Senator STENNIS. I have a memorandum here taken from a magazine article, but I am sure it is approximately correct, I mean it is based upon a checkup that has been made, referring to the Office of Secretary of Defense, not the individual there in that Office now and the memorandum says:

This Office, set up in 1947, had a planning group of about 100 people. It has grown in 11 years to an operating department with a Deputy Secretary, 8 Assistant Secretaries, 4 special assistants, and about 2,400 other people.

Now in spite of the growth of our military program since 1947, do you think that that is based on your experience, that that is a reasonable growth or that that many are necessary?

Mr. KIMBALL. I still think Mr. Forrestal's original idea about the Defense Department was correct. He envisioned it as a policymaking group with about a hundred people in it, and I would think a good group of that kind could accomplish everything that is necessary to accomplish in the Defense Department.

I don't think you could look down the throat of everyone who is writing a contract in the Army, Navy, and Air Force to the extent they do now and get any action.

Senator STENNIS. You say to the extent they do now, you are talking about your actual experience in contact?

Mr. KIMBALL. That is correct.

Senator STENNIS. With these construction jobs and these projects we have been discussing; is that correct?

Mr. KIMBALL. That is correct.

Senator STENNIS. Well, I thank you very much.

I think I have about exhausted my time.

Senator SALTONSTALL?

Senator SALTONSTALL. Thank you, Mr. Chairman.

Mr. Kimball, it is good to see you across the table. I hope you come often.

Mr. KIMBALL. Thank you, sir.

SUGGESTION FOR REVISED INTERPRETATION ON OWNERSHIP OF STOCK

Senator SALTONSTALL. Now with relation to the conflict-of-interest statute, which I have worked on, perhaps more than any other member

of this committee, for the last 4 years, it is a question of interpretation of the statute rather than the actual language of the statute itself, don't you agree with that?

Mr. KIMBALL. I think that is correct, sir.

Senator SALTONSTALL. It is a question as to whether this committee or any other committee wants to interpret whether ownership of stock is an interest which will bias a man in the job he may be doing.

Mr. KIMBALL. I believe that is correct.

Senator SALTONSTALL. Isn't that correct?

Mr. KIMBALL. Yes.

Senator SALTONSTALL. And the problem is to change that interpretation rather than to change the statute; that is my opinion.

Do you agree with that?

Mr. KIMBALL. I think you can interpret it, this committee can interpret it any way they wish to.

Senator SALTONSTALL. Yes. I think in your instance I recall very well—

Mr. KIMBALL. Practically I think of the case of Mr. Wilson which has been quite well publicized.

Senator SALTONSTALL. Mr. who?

CONTRACTS NOT PASSED UPON BY SECRETARY OF DEFENSE

Mr. KIMBALL. Mr. Wilson, because when he was confirmed it was quite highly publicized and the insistence was that he sell his stock in General Motors. Practically, he would never know when General Motors got a contract. The contracts never come up to the Secretary of Defense.

Senator SALTONSTALL. That is right.

Mr. KIMBALL. He could not influence their getting a contract or stopping a contract.

Senator SALTONSTALL. Practically speaking under the present law, no Secretary in the Department of Defense can influence a contract. He can set the policy, as you say, but control is in the Secretary of the Army, Navy and Air Force.

Mr. KIMBALL. That is right.

Senator SALTONSTALL. Now, another thing that you said that interested me, because I don't agree with my distinguished colleague here, concerns the Bureau of the Budget.

The Bureau of the Budget or the Director of the Budget is the agent of the President for financial matters and the Director of the Budget in and of himself cannot hold up funds.

He can only hold up funds at the direction of the President, who is the Commander in Chief.

Mr. KIMBALL. Well, theoretically, I believe that is so, but practically it does not work that way because I am sure the President cannot know all the times that he holds up funds.

Senator SALTONSTALL. Yes. But as you said when we appropriated funds here from the Congress, the Bureau of the Budget has to analyze those funds and make sure that they go to the proper divisions and departments of the Government, and are used for the purposes for which the Congress specifies.

Am I not correct in that?

Mr. KIMBALL. But he does not give them the money that has been appropriated. He just gives it to them piecemeal. If you ran a business that way we would never be able to run it successfully.

JUSTIFICATION MADE TO DIRECTOR OF BUDGET

Senator SALTONSTALL. Well, actually so far as the Defense Department is concerned, it is not the Director of the Budget who holds up the funds, they are rather held up by the Comptroller's office in the Department of Defense, are they not?

Mr. KIMBALL. Sometimes they could be held up there but I think most of the time they are held up, in my experience most of the time by the Bureau of the Budget.

Senator SALTONSTALL. I don't think I quote him unfairly or incorrectly when I say the present Director of the Budget tells me he has never held up funds for the Department of Defense, except on the direct orders of the President. It is my understanding, however, that the Comptroller's office in the Department of Defense, when it receives the money from the Bureau of the Budget, makes a redetermination within the Department.

Didn't you find that so when you were Secretary of the Navy?

Mr. KIMBALL. No. The Director of the Budget can hold up money and did hold it up, and we would go over to him and justify why we wanted the money then or wait for 6 months or maybe never.

Senator SALTONSTALL. And that was money that was appropriated by the Congress?

Mr. KIMBALL. Yes.

Senator SALTONSTALL. For what you thought was a specific purpose for which you wanted money right away?

Mr. KIMBALL. Sometimes the Comptroller of one of the military departments or the Comptroller of the Secretary of Defense will have some demands made on him for money that he needs for a specific problem and he will try to get it from some other avenue to put into something that is of importance.

But those are minor things, and you can explain those fairly easily. In other words a fellow from the Navy Department comes in and says "We need X number of dollars for this job that has a high priority and we can give up this other money to get it." You make a trade within certain statutory limitations. You cannot trade very much.

UNDER PRESENT SYSTEM BUDGET DIRECTOR TWICE PASSED ON NEED FOR FUNDS

Senator SALTONSTALL. That is also what we call transfer of funds to within the Department.

It would disturb me to have anybody in the Department of Defense or outside the Department of Defense get control of its funds without going through the Bureau of the Budget but only by going directly through the President because if you did that you would break up your whole budget system, would you not?

Mr. KIMBALL. You cannot get the funds in the first place until the Bureau of the Budget has approved them but after the Bureau of

the Budget has approved them and Congress has given them to him I don't think he should have the chance to stop them on the way back.

Senator SALTONSTALL. As I understood my distinguished colleague, he would, if a missile czar was appointed, give him authority to get his funds directly.

As I understand my distinguished colleague, Congress would appropriate the money, the missile czar would be able to get those funds and get them in whatever way he considered proper subject only to the approval of the President of the United States. That would bypass the Bureau of the Budget which is the fiscal agent of the President.

Mr. KIMBALL. Well, of course, he could not get the money in the first place, sir, until he had certified them to Congress. But after Congress has appropriated the money, after having heard the testimony and heard what they wanted, then I think they should have that money to use for the things they have asked for.

Senator SALTONSTALL. Yes. But that money would go through the Bureau of the Budget?

Mr. KIMBALL. It is one of the things that slows down the process of running the Defense Department very greatly, sir, in my opinion.

Senator SALTONSTALL. Well, that is a question of priority and also a question of the personality and the ability of the Director of the Budget's office to operate, isn't it?

Mr. KIMBALL. It could be; yes, sir.

Senator SALTONSTALL. Now, you also stated that you were not sure why these committees piled up in the Pentagon, these civilian groups.

With respect to the scientific problems, involving missiles, satellites, B-52's, and other new weapons, isn't the cause of these committees being formed the fact that the ordinary administrator lacks specialized scientific authority?

In other words, a man like myself, we will say, has to take the authority for satellites problems; I would want advice because I don't know the scientific background.

Isn't that really what has piled up the committees at the Pentagon as much as anything else?

Mr. KIMBALL. I don't think I quite understand the question, Senator. You get these committees——

COMMITTEE VALUE LIES IN CHARTING SCIENTIFIC COURSE

Senator SALTONSTALL. What I am trying to say is, I am a layman. I have very little knowledge of satellites and missiles and so on.

Now, assume I was in a position of responsibility to sign big contracts. Wouldn't I want to get as much expert advice as I can get before I put my name to a contract that involves millions of dollars?

Mr. KIMBALL. You have to have expert advice.

Senator SALTONSTALL. Yes, and that is what really has piled up these scientific groups.

Mr. KIMBALL. Well, for example, I think the appointment of Dr. Killian to a scientific group is a forward step because they know the things technically that we can make, and they can say here is what we wish you to look at the next year, 5 years, 10 years, 20 years.

I think they can chart a scientific course. They cannot tell you where the breakthroughs will be.

Senator SALTONSTALL. That is good or bad?

Mr. KIMBALL. I think it is good, I think it is very good.

Senator SALTONSTALL. Yes, because it is an opportunity to look far enough ahead.

Mr. KIMBALL. They should look ahead and tell you the things we should be exploring. Many things for space travel, for satellites, for new weapons that may look possible, you have got to go out and do a lot of developmental work and research work to prove that these things can work.

Now we don't know when we can send someone, for example, to the moon. Maybe you do not ever want to send anybody to the moon but if you do, you are going to have to develop the hardware to do it.

For example, in 1947, we made some high altitude sounding rockets that would go up a hundred miles. I thought that was not a very good project. I did not think it was very useful but very much to my surprise after they sent up 20 of them they kept on getting more to shoot up in the atmosphere because they found a lot of scientific breakthroughs that they could get from that far up.

Now every time you make a breakthrough you get dividends that you cannot foresee at the time.

Senator SALTONSTALL. Well, what you say is at the Pentagon today we want quicker decisions, and we want the responsibility in somebody to consider long-range plans.

Mr. KIMBALL. That is correct.

Senator SALTONSTALL. Those are your two most pertinent suggestions, are they not?

Mr. KIMBALL. Yes, sir.

Senator SALTONSTALL. Let me ask you this one more question: You speak about giving the military authority once the policy is set by a civilian.

Now, that has to be controlled in each department by one military man. For instance the Chief of the Bureau of Ships has to have the overall procurement policy for the Bureau of Ships?

Mr. KIMBALL. That is right.

Senator SALTONSTALL. And he has got to parcel it out between the submarines, cruisers, etc.

But you cannot go directly from the Secretary, we will say, to the submarine group or to the cruiser group. You have got to have some military man in charge.

Mr. KIMBALL. You have got to have the military man in charge of that who is experienced in that field, who knows where the facilities are, who knows what you can do.

Senator SALTONSTALL. So that a man like General Schriever in Los Angeles has to have a boss in the Pentagon although that military supervisor may be willing to give the man in the field considerable leeway, isn't that correct?

GENERAL SCHRIEVER MADE GOOD USE OF AUTHORITY

Mr. KIMBALL. That is correct, and that is exactly what has happened to General Schriever's group.

They gave him authority to go ahead and he has pursued this very vigorously and very well in my opinion.

Senator SALTONSTALL. And that is apparently the case with Admiral Rickover too?

Mr. KIMBALL. Yes, sir.

Senator SALTONSTALL. Just one other question, Mr. Chairman, and I thank you. The staff of the Secretary of Defense has grown since the days of Mr. Forrestal but is not there a reason for that: the Secretary of Defense, due to this scientific buildup and increasing problems that come with them, has exercised more direct control over the separate departments of the Army, Navy and Air Force.

Mr. KIMBALL. Yes, sir, he has.

Senator SALTONSTALL. And while in the statute, there is no mention of control, there are the general provisions and under those general provisions, as the Unification Act has been interpreted more power and more direct control has gone to the Secretary of Defense; do you agree with that?

Mr. KIMBALL. He has had more power. But by putting all the Assistant Secretaries and Deputy Assistant Secretaries there that have had the power of veto but not the power to initiate action, you have to come to those people to get permission every time you turn around, you just slow the process of getting these weapons, slow it down terrifically.

Senator SALTONSTALL. You don't object to giving the Secretary of Defense a more unified command but what you do object to is having deputy civilians under him?

You would have the Secretary deal directly with the military men in uniform, with the Bureau of Ships for example, or through the Secretary of the Navy to the Bureau of Ships.

Mr. KIMBALL. That is right.

Senator SALTONSTALL. And that would be your suggestion for the speeding up of the organization in the Department of Defense?

Mr. KIMBALL. Yes.

Senator SALTONSTALL. That, and speeding up the budgetary process?

WEEKS AND MONTHS TO GET THE AUTHORITY TO DO THINGS THAT THEY
KNOW THEY HAVE TO DO

Mr. KIMBALL. Speeding up the budget problem, get the people in the Department of Defense where, when the military want something done they could do it without having to ask and wait for weeks and months to get the authority to do things that they know they have to do, and then to get, and to help the military develop new weapons they are going to need for the future.

We are in a difficult position, this country, in my opinion, at the present time because we are going to have to duplicate programs for the next few years, because we cannot get rid of the weapons that we have and we have got to look to the weapons of the future.

Senator SALTONSTALL. I would just like to get this one more thought from you: Do you believe that so far as the conflict-of-interest law is concerned that this committee would not get into any trouble or need to have any worry if it loosened its interpretation of stock ownership?

Mr. KIMBALL. I don't think you would have any trouble on it.

Senator SALTONSTALL. Thank you, Mr. Chairman.

Senator STENNIS. Thank you, Senator Saltonstall.

Before you leave that subject may I for the record here make clear that I certainly was not proposing that we abandon or abolish the budget system.

My point in my questions to the Secretary was that this is such an urgent matter that requires a special direction and director, that after project authority had been justified before the Congress and the money was appropriated and the Director has designated someone to build a missile that then it should not be stopped by the Budget Director and not be stopped by anyone except of course the President of the United States who has the supreme power, and these priorities that Senator Saltonstall referred to and he said that the Budget Director going to him involved priorities with personalities, that is the very thing, as I see it, to be avoided.

It won't be any priority program once this program was put into action and the money appropriated and the selection made and there would not be any personality involved.

I thank the Senator for letting me put that statement into the record.

Senator BUSH?

Senator BUSH. Mr. Kimball, I am sorry I missed the first half hour or so of this and I did not hear the questions of Senator Stennis and only part of the questions by Senator Saltonstall.

So if I repeat anything just say you have answered them, that is quite all right with me, and I will pick it up from the record.

I did want to ask you if you have read or were familiar with the basic recommendations of the so-called Rockefeller brothers report regarding reorganization of the Defense Department.

Mr. KIMBALL. I have not had a chance to read it, sir.

Senator BUSH. You have not had a chance to read it?

Mr. KIMBALL. No.

Senator BUSH. You are not familiar with the recommendations?

Mr. KIMBALL. No; I saw a couple of newspaper pieces about it, but I did not read it carefully enough to know what the recommendations were.

Senator BUSH. Do you have in your experience both in and out of the service of the United States—do you have any comment to make on the general question of the reorganization of the Defense Department?

APPROVE BASIC PENTAGON ORGANIZATION WITH JOINT CHIEFS

Mr. KIMBALL. Well, the only thing I would say is what I have already said: I think you should cut down the size of the civilians in the Department of Defense. And I am also not at all sure that you need all the Assistant Secretaries you have in the services.

I think the basic organization of the Pentagon, with the present Joint Chiefs system is all right. I like it, and I think if we tampered with it we would not make an improvement. We would just add some more confusion to it.

Senator BUSH. You think it is appropriate for the Chairman of the Joint Chiefs not to have any vote in the deliberations?

Mr. KIMBALL. Well, theoretically he has not any vote but practically he has a lot of power.

Senator BUSH. Well, there seems to be a good deal of difference.

Mr. KIMBALL. If they do not convince the Chairman of the Joint Chiefs that something is needed, he does not have to have a veto vote. If he does not go for it, they are not going to get very far with it. I happen to think we have been very fortunate in the three Chairmen of the Joint Chiefs we have had.

We have had three outstanding men, and I think they have done a very wonderful job there.

Senator BUSH. Yes; I would certainly endorse that, and am glad to hear you bring that out.

But you don't—your mind does not run along the line of a unified command organization such as we have at the present time?

Mr. KIMBALL. No, sir, because if we have an emergency, if you have a war, a limited war or a large war, the command in the field would be given to one man, and that man would report to the Joint Chiefs.

You would have a unified command in the field.

Senator BUSH. When we get into war we have it.

Mr. KIMBALL. We have it.

Senator BUSH. When we are preparing for war we don't, that is about the size of it, isn't it?

OPPOSED TO CONTROL VESTED IN A SINGLE PERSON

Mr. KIMBALL. Well, I would be very much against having one man have the complete control of the military.

Senator BUSH. Yet during war that—

Mr. KIMBALL. You give it to a man in the field.

He is in the theater. Whether it will be the Air Force or the Navy or the Army man that will have the supreme command in that theater depending on what would be the largest interest there.

It worked in Korea and it will work wherever we get into war, but I don't see any necessity of changing the system we have.

I think it is all right the way it is.

Senator BUSH. I think the urgency, what has brought this up for serious consideration, in this session of Congress, is the great urgency of the current situation. While we say we are not at war, yet we are making preparations that would be hard to exceed if we were at war, and we feel that we must prepare for war as though it were a real problem or eventuality, and therefore I am a little interested that you don't think we should move in that direction so as to be ready for war, to act if it did happen to hit us.

Mr. KIMBALL. I think the command structure the way it is working now will work all right in case of war.

Senator BUSH. Yes, sir.

I don't think I have any other questions there, Mr. Chairman. Thank you.

Senator JOHNSON (presiding). Any other questions?

Mr. Kimball, I regret I was attending a policy meeting and could not be here to hear your statement.

I have known and admired you through the years, and I am very familiar with your distinguished record of public service. I appreciate

ciate your coming here, and we look hopefully to the work of the company that you direct.

Today Secretary McElroy announced that he had selected three of the Nation's top military men to advise him on streamlining the Defense Department. He referred to them as highly competent consultants. Some time earlier the President, in his state of the Union message, indicated a need for considerable reorganization.

Now it seems that the President is going to have the Secretary appoint another committee to study the work of the committees to determine what ought to be done by the committees.

Now, without reflecting in any way on the ability and the outstanding record of the men that the Secretary has chosen—the Chairman of the Joint Chiefs of Staff, General Twining, General Bradley, and Admiral Radford, three of our most distinguished military men, and I understand he expects to name a similar group of civilians—I wonder if you care to express an opinion from your years of service in the Department as to whether that is a proper and desirable course to be following, and whether you think that perhaps that is the best way of getting at this problem that nearly everyone testifies exists: that is, the redtape, the cumbersome procedures, the long delays from the time something is proposed until something is decided.

Now Secretary McElroy is going to have some military men and some civilians to try to determine how to streamline the Department. Do you have an opinion on the wisdom of that policy?

MILITARY ADVISERS WOULD CONTRIBUTE TO STREAMLINING PROCUREMENT PROCESS

Mr. KIMBALL. Well, I would think that, Mr. Chairman, what would probably come out of that would be that those three very capable men would make what recommendations they would see fit in the roles and missions of the services.

I don't think that they can tell you how to streamline the procurement and production of the Defense Department, because that is not their talent. Their talent is in knowing how to wage war and how the organization should be set up.

I would think that they may want to take a look at the roles and missions to clarify them a little bit.

As I remember they have not been looked at for about 10 years now, and those are 3 pretty objective people.

I would think that a committee reporting directly to the Secretary of Defense could have great value.

I used to have a system in the Navy. The Navy had a general board where you put officers that had retired or were about to retire and give them specific problems to work on where they had nothing else to do but consider those problems, and I would think that General Bradley, Radford and Nate Twining could make great contributions.

Senator JOHNSON. As I understand it these military men with a group of carefully selected civilians are going to act as a committee of consultants to the Secretary in an attempt to evolve ways and means of improving the organizational structure of the Pentagon, and in your opinion—

Mr. KIMBALL. I think that would be constructive, sir.

Senator JOHNSON. That step is long overdue.

Mr. KIMBALL. Yes, sir.

Senator JOHNSON. Do you have any specific suggestion you have not already offered the committee that you think would be worthwhile to the committee as to how we can expedite and accelerate our preparedness program?

Mr. KIMBALL. No, I think I have covered those fairly well, Senator.

Senator JOHNSON. All right.

Any other members of the committee have any questions?

Senator SYMINGTON, have you had an opportunity to question the witness?

Senator SYMINGTON. No, I have not.

Senator JOHNSON. Would you like to?

Senator SYMINGTON. I would like to if I may. I am sorry I was not here at the beginning.

Mr. Kimball, it is a great pleasure to see you here, sir, an able and former colleague. I am sorry I was prevented from being here before.

I have had a member of the staff summarize in effect what you have testified to. I would like to, if I might, ask you about the Bureau of the Budget situation.

As a manufacturer as well as one who has devoted a lot of time in the Pentagon building, reprogramming and programming are very essential in order to do an adequate job from the standpoint of good products, at the right costs, are they not?

Mr. KIMBALL. That is correct.

UNEVEN PROGRAMING RUNS COSTS "ALL OUT OF SIGHT"

Senator SYMINGTON. And is it not true that often as companies get going on programs, and then for fiscal reasons only they are kept pushed up and down, there is a very damaging effect on cost?

Mr. KIMBALL. You run your costs all out of sight.

Senator SYMINGTON. I have been thinking about this for some time, and I would like to ask you the same question I asked Mr. Gross. We could take three short concise steps—first, decide what the danger is, how real it is and what it consists of; and, second, as a result of that decide what we need to meet it; and, third, establish long-term programs to get that as quickly as reasonably possible, and with an organization which would give us maximum efficiency and therefore lowest cost. If we did that, these three things in that order do you not think we would ultimately end up by getting defense for less of the taxpayers' money than under the present plan?

Mr. KIMBALL. I am sure we would. I might elaborate on that a little bit.

Senator SYMINGTON. I wish you would.

Mr. KIMBALL. When you start on a program, if it is a long-range program that you are not sure you are going to be able to do, you have some basic research to do. Then of necessity you are going to have to take some time before you prove out your point and get the hardware ready. But after you have proved it out—for instance, in the present missile business in the ICBM and the IRBM, we know those are going to work. There is no question. We have made that

breakthrough. It is just a question of getting the hardware together and making it work.

Now, if we need them, let us decide now how many we need and set up to make them. If you want a number of them next year, we cannot wait until next year and say you want five times as many. It takes about a year to get the steam up in this thing. Then if you change the course in the middle of it, your costs go up. We can certainly make these things a lot faster and cheaper if we know where we are going to go. It seems to me we know we are going to have to have these. We know we are going to have to have them in fairly substantial number. They should make up their minds now to tell us what they want because what they tell us this year is what we are going to make next year.

MINIMAL RISK OF HIGHER COSTS WOULD ASSURE HIGHER TURNOUT

Senator SYMINGTON. Some of the testimony shows that on some of these new military items the production schedules are almost unbelievably low. Yet they could be very much extended with no more risk to the Government than, say, 10 percent, because that 10 percent of the overall cost would enable somebody like you in the engine business to cover on the long-term items, is that correct, as you see it?

Mr. KIMBALL. That is correct.

Senator SYMINGTON. And speaking of engines, you are 1 of the 2 manufacturers of what you might term modern long-range surface-to-surface missile engines, is that not correct?

Mr. KIMBALL. We are in the propulsion field in most of the missile programs we make some part of the propulsion systems for.

Senator SYMINGTON. Yes. I think you and North American are the two concentrating in this field the most, are you not?

Mr. KIMBALL. In the liquid field. In the solid field there are a couple of other companies also. The thing that worries me about engines is that I don't think we are doing enough basic thinking about new types of engines that this country needs. If we look back historically, every engine that we are using in this country now has come from some foreign country. England brought out the jet engine. The French brought out the old rotary engine. All the new engine ideas we seem to get and adopt from some foreign country.

There is a lot of new engines that I think can be developed, but they may be a year off, they may be 5 years off, they may be 10 years off, but we do not seem to ever want to look at new ones until we are forced to do so from abroad.

NOT ENOUGH BASIC RESEARCH ON ENGINES

Senator SYMINGTON. What do you think we could do to change that?

Mr. KIMBALL. Well, I would hope that the group that Dr. Killian is heading now would take a look at that field and make some recommendations on it. I think they very well might, because there is certain technical advances that it seems to us can be made over the next period of years if we start doing the basic research on them now. But if you wait until you are right up against the gun to start working on new forward-looking ideas—in other words, your top speeds now

are roughly Mach 2, twice the speed of sound. There is no reason in some people's opinion why you are not going to be able to fly at Mach 3, Mach 4, or Mach 8 or Mach 10, but you have to start developing the hardware that is going to give them that propulsive effort 10 years before you get the products.

Senator SYMINGTON. Then am I to understand you do not feel we are putting enough basic research into the engine picture per se?

Mr. KIMBALL. That is right.

Senator SYMINGTON. And after all, a design of any new plane depends upon the horsepower or now the thrust that you get. All the aeronautical design has to depend on that, does it not?

Mr. KIMBALL. That is right, until he knows what you can get in the way of propulsion, you have to build your vehicle around the propulsion system that you are going to have.

Senator SYMINGTON. Would you be good enough to give this committee, if the chairman so approves, an analysis, as to what steps we ought to take in the engine fields in order to make ourselves more competitive with the rest of the world?

Mr. KIMBALL. I am not thinking about being competitive with the rest of the world. I think we should be in advance of the rest of the world.

Senator SYMINGTON. I agree with your amendment. Would you give us your thoughts as to how we can get ahead and stay ahead in the engine field per se?

Mr. KIMBALL. I would think, Senator, I would have to do that in closed session. So much of the stuff would be classified that I would not want to discuss it in public.

Senator SYMINGTON. I did not mean right now.

Mr. KIMBALL. I will be glad to send you for the records here a classified document on what I think we should be doing for the next 10 years in advanced propulsion systems.

Senator SYMINGTON. Mr. Chairman, I would request, if it is in order with the Chair, that Mr. Kimball be asked to do that. I have already asked him and he said he would, to file it in the record at this point for the record as a classified paper.

Senator JOHNSON. Without objection, that will be done.

Senator SYMINGTON. Mr. Kimball, it is a great pleasure to see you again, sir.

Mr. KIMBALL. Thank you.

Senator SYMINGTON. Thank you very much.

Senator JOHNSON. Senator Saltonstall.

Senator SALTONSTALL. I have just one, Mr. Kimball, stimulated by what you said to Senator Johnson. You say a study of the roles and missions at this time, is a good thing by these three men—Bradley, Radford, and Twining. Would you not include in that also an examination of strategic planning?

Mr. KIMBALL. I would think roles and missions would cover strategic planning, also.

Senator SALTONSTALL. You intended it to cover strategic planning?

Mr. KIMBALL. Yes, sir.

Senator SALTONSTALL. Thank you, that is all.

Senator SYMINGTON. Mr. Chairman, may I ask one more question.

Senator JOHNSON. Senator Symington.

QUESTION OF ADVISERS BEING DIVORCED FROM DAY-TO-DAY SERVICE ACTIVITY

Senator SYMINGTON. Based on your own experience and your knowledge of the current situation in the Pentagon—nobody has greater respect for General Twining than I do—would it not be advisable to have all the people on a top-level policy committee be people who were not devoted to day-to-day operating activity?

Mr. KIMBALL. It would seem that—yes, I would say that it could well be, except that General Twining is the Chairman of the Joint Chiefs. There has only been 3 and I would think they would want 1 from each service. I would think it would be better to have one that had that general knowledge such as General Spaatz.

Senator SYMINGTON. That is what was running through my mind. One of the basic problems, as was pointed out in the Rockefeller committee report, is the question of the disassociation of the operating from the planning. In other words, the effort to further define the question of two hats and perhaps eliminate it. It is more difficult for one who is actually operating and also planning to look at a problem in a completely objective fashion, would it not, as compared with people who have already been through the operating mill.

Mr. KIMBALL. I would think you would have some advantage if there would be people that had been out of the service. However, I do have such respect for General Twining, I would be perfectly willing to take his judgment in these things.

Senator SYMINGTON. I agree with you on that, but I was just talking the theory.

Senator SALTONSTALL. Will the Senator yield for an observation?

Senator SYMINGTON. I will be glad to.

Senator SALTONSTALL. Unless you have General Twining, you do not have anybody from the Air Force.

Senator SYMINGTON. The able former Secretary of the Navy has just answered that question when he mentioned the name of General Spaatz. General Spaatz was a Chief of Staff of the Air Force, although he has not been a chairman.

Senator JOHNSON. Any other questions, Senator Symington?

Senator SYMINGTON. No, Mr. Chairman.

BELIEVES SECRETARY OF DEFENSE NEEDS NO ENLARGED AUTHORITY TO
ELIMINATE RED TAPE

Senator JOHNSON. Senator Bush? Senator Saltonstall? Counsel?

Mr. Kimball, I have before me a report by the President's Citizens Advisers on the Mutual Security Program. This group is a very distinguished group headed by Mr. Benjamin Fairless, the coordinator; and Mr. Darden, a former Congressman and governor and president of the University of Virginia; Mr. DuPrey, John L. Lewis, General Reed, General Walter Bedell Smith, and Jess W. Taft.

Now, in referring to the coordination of this mutual-assistance program, they point out that we have found 37 successive failures in the coordination procedure for military assistance projects as shown in the supplement, and then they show you 37 steps here that must be taken before the time of decision is made. They point out the trouble, as all the witnesses have pointed out before this committee. But when we do get the report, somebody finally has to take action.

Now, as I see it, the Executive is the action arm of the Government, and it seems that the Secretary of Defense is now setting up a committee to recommend to him the action that should be taken. It seems that the President is familiar with the need for action as stated in his message.

Now, I want to ask you this question: In your opinion, does the Secretary of Defense have adequate authority to take the action necessary to streamline the organization and to cut out the redtape that you have encountered?

Mr. KIMBALL. I am sure he has.

Senator JOHNSON. You think he has?

Mr. KIMBALL. Yes.

Senator JOHNSON. Certainly the Commander in Chief has adequate power.

Mr. KIMBALL. I think so.

Senator JOHNSON. What do you think about Mr. Holaday's power?

Mr. KIMBALL. Mr. Holaday's power, as I see it now, is an advisory capacity to the Secretary of Defense.

Senator JOHNSON. So he has only the authority and power the Secretary might decide that he desires him to have?

Mr. KIMBALL. That is right.

Senator JOHNSON. Mr. Kimball, the committee appreciates your contribution and your coming here to advise with us. We thank you very much.

Mr. KIMBALL. Thank you, Senator.

Senator JOHNSON. I should like to observe so all Senators may be on notice that it is going to be necessary for us to leave the committee room before 5 o'clock. We have agreed with others who desire to use the room that we will vacate it by 5 o'clock.

I should like to also suggest that we review with the Senators who are members of the subcommittee the names of witnesses that they may desire to have called as well as those that they have already requested be called. The Chair is going to designate a subcommittee made up of the Senator from Mississippi, Mr. Stennis, the vice chairman, and the Senator from Massachusetts, Mr. Saltonstall, to review with counsel a list of witnesses and possible dates that they can appear, to list any additional witnesses that they think we should hear, and to make recommendations to the committee as to the time these witnesses can be heard and when we can conclude the hearings of the committee.

I hope that the counsel will meet with this subcommittee or this task force. It is a procedure that was followed in the MacArthur hearings. I think that Senator Saltonstall and Senator Stennis will work with the counsel and we can arrange for a more orderly conclusion of the hearings. I ask you to meet with the counsel at your earliest convenience and report back to the full committee with your recommendations.

Senator SALTONSTALL. Mr. Chairman, whenever the counsel is ready if he will notify me, I will be glad to meet.

Senator JOHNSON. May I ask, just as a matter of curiosity, how many witnesses have you listed to appear?

Mr. VANCE. Next week, sir?

Senator JOHNSON. All together, how many witnesses remain to be heard?

Mr. VANCE. About 13 more, I think, roughly.

Senator JOHNSON. 13 additional witnesses?

Mr. WEISL. Many will appear together so they will not be examined separately.

Senator JOHNSON. And how much time do you anticipate it will take for those 13 as near as you can tell?

Mr. VANCE. Probably through next Thursday.

Senator JOHNSON. The next witness is Mr. Lawrence A. Hyland, vice president and general manager of Hughes Aircraft Co. Mr. Hyland assumed that position in 1954. He became a member of the Guided Missiles Committee of the Research and Development Board, National Military Establishment, in 1948.

Prior to joining Hughes Co., Mr. Hyland was an official for a number of years for the Bendix Aviation Corp.; before that, the Bendix Radio Corp.

We are pleased to have Mr. Hyland here. I am sure he has much of interest to tell us.

Mr. Hyland, will you stand, as is customary, and raise your right hand and take the oath.

Do you solemnly swear that the evidence you give this committee will be the truth, and the whole truth?

Mr. HYLAND. I do.

Mr. SHANK. I do.

Senator JOHNSON. You have a prepared statement, Mr. Hyland?

Mr. HYLAND. I do, sir.

Senator JOHNSON. Will you proceed to make it?

TESTIMONY OF LAWRENCE A. HYLAND, VICE PRESIDENT AND GENERAL MANAGER, HUGHES AIRCRAFT CO., CULVER CITY, CALIF.; ACCOMPANIED BY R. J. SHANK, VICE PRESIDENT, ENGINEERING, HUGHES AIRCRAFT CO.

Mr. HYLAND. It is true that the sputniks have brought about a new worldwide respect for the power and achievements of the Soviet Union. They are the symbols of a very real and sobering technological progress which we can afford to lag behind only at the peril of our very lives.

But the sputniks have also done for us something we may never have succeeded in doing for ourselves—they have at last awakened the American people and unified them to a degree that no other single force has ever been able to achieve. They have made up our minds for us that we are going to meet the challenge.

What we need is brains, which we have; money, which we can raise; and time, which we have dissipated and are continuing to waste at a frightening rate.

Of these ingredients, time is the one which, once spent, can never be recaptured or replenished. To attempt, as some extremists have proposed, radical and sweeping changes in our Defense Establishment so as to find ourselves virtually starting all over again, is to ignore the clock—probably fatally.

It is my belief that we can organize and successfully prosecute our effort with only a few key changes in our present pattern and conception.

I believe that we can concentrate our skills and energies; take advantage of all the very real abilities and achievements of the three branches of the service; eliminate rivalries and duplications; accord the scientist the place in our Defense Establishment he must have if our military technology is to stay abreast or forge ahead of Russia; and keep this Nation from going broke—all without turning the house upside down.

I believe that these simplified solutions are apparent to most large defense industries in their own relationships with the Defense Establishment. They are certainly apparent in the company by which I am employed.

HUGHES ARMAMENT CONTROL SYSTEMS IN UNITED STATES AND CANADIAN PLANES

The Hughes Aircraft Co. develops and manufactures weapons systems for air defense. Its major products consist of aircraft armament control systems, air-to-air guided missiles of the Falcon series, and ground and shipboard radar and computers related to air-defense operations. Hughes armament-control systems are in all types of United States and Canadian Air Force all-weather interceptor airplanes, and the Falcon is a principal armament of the Air Defense Command.

The problems of technology, manufacture, and use associated with air defense against manned bombers are complex, difficult, and present many challenges. Nevertheless, they are reasonably well understood and can be solved with appropriate effort.

The impediments to the appropriate effort are the same in air defense as in ballistic missiles, satellites, or any other military area. Until we solve the major Government and Department of Defense organizational problems, there is no point in trying to unravel the maze of detail associated with individual areas, nor will any benefit result from the introduction of more billions. Conversely, I am confident that, with an organization and funding attitude quickly and realistically revised to meet the challenge of today's new preparedness requirements, the individual problems will be promptly and economically solved.

Therefore, I shall first address myself to what I regard as the fundamental situation, the reasons for it, and what we can do about it.

In my opinion, it is now, and has been for some years, possible to assess with a fair degree of precision the nature and magnitude of the threat and of the measures necessary to provide an optimum defense. However, these measures have not been provided for in the programs recommended to the Congress for two reasons: (1) because we have an indecisive and diffuse organization of our Defense Establishment, and (2) because the magnitude of the programs has been dictated by the budgetary elements of Government without regard to their military sufficiency.

Complicating the situation to an increasing degree for the past several years has been the ballistic missile program with its proper first priority status in the national military picture. As ballistic funding requirements increased with advancing progress, and as the military budget was held at an arbitrarily fixed level, the funds

for these missiles had to be taken from the remainder of the military-procurement program.

Here again secondary consideration was given to the threat, and what ballistic missile production preparation was authorized fell far below an effective level. Hence, we find ourselves with a starved air-defense program, with a ballistic-missile program which is diffused and underfinanced, while supporting three similar unbalanced and overlapping program in the air, naval, and ground forces, all adding up to a total capability which is much less than the security of this Nation requires.

The military departments recognized this unfortunate situation. They did their best in their individual areas to promote their programs and acquire the funds which would allow them to carry out the responsibilities with which they were charged.

AGENCIES IN CONTINUAL SCRAMBLE FOR INADEQUATE FUNDS

However, with three equal agencies competing for the inadequate funds, and no decisive management control, there has been a continuing scramble, with never-ending reviews, emergency succeeding emergency, and with advisers and experts piled on to the already ineffective organization.

That there are management difficulties today is not surprising, since in the space of a few years we have seen our ocean moats disappear as obstacles to an enemy while at the same time armament deadliness has multiplied a millionfold.

The tidy, historical division of the Armed forces, based on relatively slow modes of transport, which formerly served so well, is no longer capable of managing the "high speed and soon to be super-speed" military world of today.

This was foreseen by James Forrestal some years ago, and he succeeded in bringing about the first step toward unification of the Defense Establishment. Experience, further weapon development, and enemy progress have shown that we must go further, and by a truly unified management structure make possible a speedup of decision and clarification of purpose.

This management, we have in being today, lacks only a few key changes in arrangement and responsibility. When I say we have this management available today, I mean that the uniform personnel in the military services are perfectly capable of managing the design, procurement, and operations necessary to the national defense, provided we allow them to exercise the skills and the competence which they possess.

I have been intimately associated with business, with science and engineering, and with the military services for a period of 40 years. I know of no more capable or dedicated groups of men, nor do I know of any groups with more vision or fortitude than are contained in our three services. However, in the uncertainty that has beset all of us in this transition from historic slow motion into the jet-missile-atomic warfare of the present, we have imposed on the services an organization certain to be ineffective and then have tried to patch up the defects with consultants, committees, advisers, and czars. Incidentally, I am one of those consultants.

You will note that in my comments on service personnel I stated my belief in their complete competence as to design, procurement and use, but did not include research and development where special support is advisable.

I think that all of us have recognized in late years that modern warfare is inseparably linked to science, and is one of the strongest supporters and users of science. Those of us who spend a lifetime in operations and administration frequently lose touch with the great progress and potential of our laboratories and of our scientists and engineers.

We become accustomed to, satisfied with, and secure in our present state and need the stimulation of independent and informed scientists in order to keep our objectives fresh and progressive. To this end in my plan of management I am making particular provision to bring this about in proper balance with our administrative and operational groups.

PROPOSALS FOR REORGANIZATION OF DEPARTMENT OF DEFENSE

What I propose for the organization of the Department of Defense is the following arrangement:

1. That the office of the Secretary of Defense not be changed basically except as to the Assistant Secretary of Defense for Research and Engineering. This office should be reconstituted so that it resembles the office originally established by Dr. Vannevar Bush, and that it again should be called the Assistant Secretary of Defense for Research and Development.

This office should reassume control over research and development funds. Engineering and design responsibility should be returned to the services.

2. The Joint Chiefs of Staff be retained in their present structure except in two respects: (a) A full-time, voting member should be added to the Joint Chiefs of Staff who is a nationally respected and recognized scientist; he should have functional coordination of the research and development activities in the services and be responsible to the Assistant Secretary of Defense for Research and Development; and (b) the Chairman of the Joint Chiefs of Staff should be given three votes so that he may settle any controversial issue, but not override all of the other members.

3. I concur with the suggestion of the Rockefeller group and recommend that all officers of the rank of general or admiral should be officers of the Armed Forces without service affiliation, so that their careers and judgments will no longer be dependent upon individual service association. This is merely an extension of the principle already recognized that a general or flag officer is no longer a specialist in a particular arm, but is capable of overall command involving any or all arms.

4. The foregoing three key changes can be made effective with minimum disturbance, can take advantage of all existing organization capability, and can smoothly and quickly lead to whatever realignment in policy and organization as is dictated by the developing military threat.

Along with these changes in organization and responsibility I would also make a few comments which should assist in the effective administration of affairs within the Department of Defense.

In our complex modern affairs, operating control and fiscal control are almost synonymous. Although suitable staff is necessary for coordination, planning and functional supervision, yet it must not act as a buffer or barrier to the fiscal support necessary for the operating agencies.

Planning is a continuous process and is constantly changing with progress. To withhold action because of forever chasing rainbows is to lose vital time and create an artificial emergency with resulting confusion and recrimination.

ADVOCATES REJUSTIFICATION OF PROJECTS ONLY WHERE THERE ARE MAJOR
PROVABLE CHANGES

The funds appropriated by the Congress should be allocated promptly on the basis of existing plans to the procurement and operating agencies charged with the particular mission to be performed and those agencies then held accountable for the results. The practice of rejustification of projects and policies in the absence of major provable changes in circumstances should be discontinued forthwith.

Experience has shown that the most effective means to reduce unwarranted staff interference with operating agencies is to reduce the staff to a degree where there is no time left over for operating functions. It is unfortunately true that any staff can justify its operating and its needs for increased personnel.

Therefore, any reduction can be accomplished only by arbitrary action, and I would suggest 20 percent across the board as a first step, after which management review may disclose further desirable reductions. Because of the presently overwhelming staff and its encroachment upon operating prerogatives, any program or policy is now subject to continual review and rejustification, and the best talents in the country are tied up in this process instead of in the effective administration of those programs we do have.

Let me give you an example—the Chief of the Bureau of Aeronautics of the Department of the Navy, who is the top officer in the design and procurement of naval aircraft, has 107 civilian and military staff seniors in the Department of Defense, any of whom can demand his presence and review his programs. This is an impossible situation.

The present and proposed missile czars also should be dispensed with. In this connection, I want to point out that in my opinion the success of the Manhattan project was at once the best and worst thing that could have happened to us.

It solved a special single product situation in a limited area of interest. The pattern was good for that situation in that area and at that time, but it is not good for the immensely more complex military problem. We must keep in mind that the military problem involves thousands of products and tens of thousands of situations and suppliers. The military are capable of organizing to accomplish each in its proper relationship. As examples are the very effective, though competing and overlapping, organizations under Generals Schriever and Medaris and Admiral Raborn for the ballistic missile program.

Because we are in a predicament on account of top management and budgetary reasons, because we have allowed our national educational policies to lag, there is no justification to tear down the whole complex, otherwise workable, structure of our military organization.

Let me insert a warning at this point. If the power of decision is not given to the responsible officials in the present Defense Department then we must have the czars as our only hope for decisive action in limited areas.

DR. KILLIAN DOING EXCELLENT JOB IN CLARIFYING SCIENTIFIC SITUATION

Also I do not want my remarks on Defense Department management to be applied to the general scientific job assigned to Dr. Killian, who is doing yeoman work, and is clarifying and strengthening our whole scientific situation.

My plan calls for increased recognition of science and its appropriate place in the organization. I want to emphasize that both the national and military budget offices should stick to their knitting and stop trying to operate the services.

The scientists and engineers in these offices should be transferred back into the technical areas where they belong. Science, finance, intelligence, diplomacy, and many other factors are parts only of the whole national policy which must determine our military plan and establishment.

To allow any one factor to dominate is to debase the policy. Korea and sputnik surely have taught us to listen to science, to pay attention to intelligence, and to look upon budgeting in its true sense, which is, "the statement of estimated income and expenses."

I am willing to pay whatever it takes for my children to survive with our American freedoms. I want the military people and our scientists to tell me what it takes, and I want the budgetary department to tell me what it costs.

At this point I want to bring up the subject of competition because there are many who believe that the American competitive system, which has proved so worthwhile in promoting the national welfare to date, is still the best solution to effective and economical development of our weapons and to alertness and efficiency in the several military services.

It must be recognized, of course, that no single policy will forever provide the answers to all problems. A competitive approach is desirable so long as a weapons system is comparatively simple or a tactical problem is limited in scope. Today, however, almost any weapons system is a billion-dollar project. The competitive approach is simply too expensive in money, men and facilities.

Let me give you an example: the Jupiter-Thor controversy. Either missile will work satisfactorily; the differences between them are the differences between Tweedledee and Tweedledum. We could have had one IRBM and a satellite, or any of several other desirable combinations.

Instead, we have spent the money for two of the same thing on a slower schedule, with personnel frustration, with a bad hole in the program, and a multiplied logistics problem—plus the penalty of a billion dollars. We have to adapt ourselves to this changed complexity, enormous cost and high stakes. We have to rely on a form

of management that will give us the best possible substitute for competition in those cases involving big weapons systems. In this function the judgment of the services, as supervised by a decisive Department of Defense and scrutinized by the Congress, should be trusted.

WE MUST NOT CONCENTRATE ON PARTICULAR MISSILES

Now, I want to remark on our total military posture. The rude awakening that we have experienced since the sputniks should not result in too much concentration on any particular weapon to the detriment of others. In the face of an alert, aggressive enemy constantly probing our weaknesses, we must maintain a balanced national defense program of adequate proportions in all areas.

First in importance for the long-range future is the control of space.

First in the immediate future is the possession of long-range missiles.

First today is the possession of strategic bombers and nuclear submarines.

Second only to these in each time period are the defensive weapons to counteract each threat.

The greatest psychological victory the Russians could possibly achieve from the sputniks would be to seduce the United States from a balanced program into a costly effort of questionable military value to fill the sky with satellites.

This does not mean that we should fail to promote vigorously an adequate satellite program which will be still in the research and development stage for some years. This we must do if our children and our children's children are to survive.

Let us keep our heads clear, our emotions under control, and insist on first things first.

Finally, I want to comment briefly on specific items relating to the business of our company as these items may illustrate overall problems within the Defense Department.

1. Our research programs are contracted for on a year-to-year basis, although some of them, by their very nature, are long-term investigations.

State-of-the-art development in particular is something which should be carried on continuously in order that we may have a constant stream of new information and new devices to apply to the weapons systems under development. Long-term and state-of-the-art research is restricted at the present time because a company or institution must set the level at a point within its capability to carry on in the event that the Government support is withdrawn at a fiscal year-end. We feel that a three-year basis with an annual review and continuation based on performance is the minimum for the sound conduct of research programs.

2. The operating commands are at the end of the line and suffer most from the limited funds. The Air Defense Command is a case in point. The provision for operating and maintenance in the Air Defense Command is completely inadequate.

Again, because of the shortage of funds, spare parts have been trimmed below the necessary minimum, facilities for servicing and maintenance are entirely inadequate, and contractor assistance is limited.

The Air Defense Command is charged with operating an air defense which is only partly coordinated as to facilities, weapons and personnel training. Again this comes about from both the lack of decisive management at the Department of Defense level and inadequate funds.

I want to give you the picture of an existing situation. The equipment we supply is extremely complex and represents at any given stage the furthest advance in the art of target detection, fire control and air-to-air missiles that we know how to make. Maintenance requires highly trained technicians and sensitive test equipment.

Imagine, for example, servicing of such equipment in the Duluth squadron at night at this time of year. An aircraft is parked on the ramp and is alerted. The technician must climb up on the airplane with a flashlight under his arm and attempt to make precise adjustments with fingers blue with cold and in danger of freezing onto metal tools. There may be a blizzard or freezing rain. This is an actual condition and is typical of many facility deficiencies.

3. Another very important item which is fundamental, if we are to have real national defense, is the compensation of the service people. I am referring now to the enlisted technicians who service our equipment, but the problem exists at all ranks.

We require highly intelligent men having had extensive training in order to make our equipment perform satisfactorily. We wish this were not true, but it is a situation brought about by modern weapons requirements. Men of this talent and training cannot be retained in sufficient numbers in the military services with the present pay and prerequisites.

APPALLING SHORTAGE OF SKILLED MAINTENANCE PERSONNEL

Many of the squadrons we service have only 20 percent of the skilled personnel necessary to maintain these modern complex weapons systems. I do not believe the new budget recommendations for military pay are adequate. Until the military pay scales can be properly adjusted, it will be necessary to contract for maintenance on a much more extended scale, and this will be a requirement for some time to come.

In closing, may I say that I am not at all discouraged by the prospect, nor do I think that the problems that I see ahead are beyond the scope of our capabilities. I am vastly encouraged at the grasp which the committee has shown, as evidenced by their public utterances. I want you to know that I share with all of us a part of the responsibility for the complacency with which I think we have viewed our situation in the past. I am thankful that the Russians chose to wake us up with a sputnik instead of with a bomb, and being awake, I am now ready, as you are, to get on with the job.

Thank you very much.

Senator STENNIS. Mr. Hyland, we thank you very much for a statement that has a great deal worthwhile in it, I think, and we will now ask counsel to examine you further on some of the subjects.

Mr. HYLAND. Mr. Chairman, I have with me Mr. Robert Shank who is our vice president of engineering in the Hughes Aircraft Co. He graduated from Goshen College, Purdue University, with a degree of

bachelor of science in electric engineering, joined the Hughes staff in 1947, was previously associated with the Bell Telephone Laboratories.

Mr. Shank has had over 20 years of experience in the electronic field and particularly in major weapons systems.

Senator STENNIS. We are very glad indeed to have Mr. Shank and Mr. Hyland and you may direct any question you wish to him or counsel may direct any question he wishes to you.

Mr. WEISL. Mr. Hyland, counsel has tried to carry out to the utmost of his ability your admonition to keep his head clear and his emotions under control.

In your last sentence of your fine statement you make the observation that you are thankful that the Russians chose to wake us up with a sputnik instead of with a bomb. And now that we are awake, we will get on with the job. The Hughes Aircraft Co. has a very important part in our defense program. Has that part been accelerated by the Defense Department since sputnik?

Mr. HYLAND. Quite the contrary. It is a little bit difficult question to answer. We have some more money in certain areas, but, for example, in the missiles, the funds have actually been reduced since sputnik, I think largely because of the demands for ballistic-missile funds.

Mr. WEISL. Then the public has something to be thankful for to be awake but apparently the weapons manufacturers who are supposed to protect the public do not have very much to be thankful for.

Mr. HYLAND. Well, of course, sputnik happened to coincide with the budgetary exercise when it appeared that the Defense Department was not going to be able to pay its bills so that we have been going through a series of violent oscillations and I do not think that there has been a settling down yet which would indicate to any manufacturer what his future is at the present time.

Mr. WEISL. Well, your situation, with the exception of Polaris, is not unusual.

Mr. HYLAND. No.

NONBALLISTIC-MISSILE PROGRAMS HAVE SUFFERED SINCE SPUTNIK

Mr. WEISL. Are there any other instances of necessary military weapon production having been cut down since sputnik?

Mr. HYLAND. I am not generally familiar with all of the other weapons systems. I do know, and from speaking to the various aircraft companies and contractors, we have generally the feeling that there has been a reduction in most programs not associated with the ballistic missile picture since sputnik.

Mr. WEISL. You pointed out in your statement that first, today, is the possession of strategic bombers and nuclear submarines. Do you know whether or not strategic bombers have been accelerated or cut down since sputnik?

Mr. HYLAND. As of my own knowledge, I do not, sir. But reading the newspapers, I understand that there has been a \$700 million reduction.

Mr. WEISL. That does not look as though the Government was awakened to the dangers engendered by sputnik.

Mr. HYLAND. I will answer your question flatly—no.

Mr. WEISL. Yes, sir.

Mr. HYLAND. I do know that since sputnik there is as yet no material acceleration that I can see anywhere in the Government or the Department of Defense. And as a matter of fact, there is still this hangover of our budgetary deficiency.

Now, I have heard of one or two minor accelerations, which I am sure you are aware of, in the ballistic missile program, but they are peanuts as against the requirement that we have.

Mr. WEISL. What do you suggest we do to bring about the necessary awakening?

Mr. HYLAND. Of course, what I do suggest is that you follow the organizational plan that I have recommended. I know that the military do know what the weapons requirements are. I know that we still have a situation where each service, to a degree at least, is charged with the defense of the Nation. Therefore, each one of them thinks they must do the whole job or a very substantial part of it.

We have to unify the command and make it possible to allocate to each of them the job they have to do, and then I think that we can promote a program that will be effective and ample in size for the Nation.

Mr. WEISL. Mr. Hyland, in your statement you make the observation, and I quote:

The competitive approach is simply too expensive in money, men, and facilities.

And then you give as an example the Jupiter-Thor controversy where you state that:

Either missile will work satisfactorily. The differences between them are the differences between Tweedledee and Tweedledum.

Now, we have had sworn testimony here that there is a difference between the two systems, one, in the guidance approach, and, two, in the nose-cone approach, and therefore that one is a back-up or insurance for the other, and the observation was made that there is roughly the same difference as between a Chevrolet and a Cadillac.

Do you agree with that testimony?

NO SUBSTANTIAL DIFFERENCE BETWEEN THOR AND JUPITER

Mr. HYLAND. I completely disagree. In the guidance, I think I can say without crossing any classified lines that the primary difference is that the gyros in one have air bearings and the gyros in the others have oil bearings.

The basic principles of guidance are not essentially different.

As to the nose cones, I will not go into the detail there, but what is a suitable design of nose cone for the one is also a suitable design of the nose cone for the other.

I am completely convinced that either missile will do the job. I think as a matter of fact that Thor will do it a little quicker now because it is, for certain reasons which you gentlemen know, I think, it is more capable of being put into production at a little faster rate.

Mr. WEISL. Have you any idea as to how much the extra cost will be as a result of making both these weapons systems instead of one or the other?

Mr. HYLAND. I am sorry, sir, I do not. It will be substantial, and the real waste, of course, is in the dedication of two manufacturing and design agencies to do a job that one can do. Because our shortage is a shortage of talent.

Mr. WEISL. You also state, Mr. Hyland, that the competitive approach in the awarding of weapons system contracts is simply too expensive in money, men, and facilities. What would you substitute for it?

Mr. HYLAND. I would substitute the same kind of operations that are now being used, and I cited the organization supporting General Medaris, the organization that General Schriever has or the organization that Admiral Raborn has. I mean you have to select an agency to supervise and monitor, but I want to point out very firmly that the competitive approach must be discarded only in very large and complex weapons systems.

I think the services are perfectly capable of putting up the kind of an organization that can manage and supervise this kind of work, and I am an admirer of each of those three organizations. They are doing a magnificent job. They are well suited to keeping the costs down and beating the ears of the contractors back when necessary to keep them in hand, and I think that we have got to pursue that sort of management for these big jobs.

UNIFIED COMMAND AT TOP WOULD ELIMINATE INTERSERVICE RIVALRIES

Mr. WEISL. Then, on page 1 of your statement you speak of eliminating rivalries, the necessity of eliminating rivalries. Are you referring to interservice rivalries?

Mr. HYLAND. Yes, sir.

Mr. WEISL. How would you eliminate those interservice rivalries?

Mr. HYLAND. Again by having the command unified from the very top. In effect, you will notice that I make the Joint Chief of Staff chairman a deciding factor in all of these areas, except that he cannot override everybody, if they are against him, and I think that is sufficient protection. Also by making the general officers, officers of the armed services, and pointing up, as we now do not point up, that the military problems of the United States are the problems of all of us and not the particular services.

Right at the moment the career of an officer in the service is subject to his being able to promote the interests of that service. I want to make his career depend upon the solution of the problems of the Nation as a whole.

Mr. WEISL. Would you require that a member of the Joint Chiefs not be the head of the particular service that he was in before he became a member of the Joint Chiefs?

Mr. HYLAND. No, I would not. I have enough confidence in these people, given the right kind of an organization, to know that they will conduct themselves in accordance with the needs of the Nation.

Mr. WEISL. Isn't that the well from which these rivalries spring?

Mr. HYLAND. Yes. But in business organizations, we face that problem, and I will admit that having come up through the electronic route, every now and then I lean a little bit to try to promote the interests of those fellows in my company. Nevertheless, they and the supervisors that we have in divisions of business, once they get

associated with the general office, do conduct themselves generally with relationships to the needs of the company as a whole, and I think the relationship is no different with respect to the needs of the military services.

Mr. WEISL. You also point up very properly the necessity of vesting control of research in the hands of an Assistant Secretary in charge of research in the Defense Department. How would that operate, Mr. Hyland?

Mr. HYLAND. I think that I would like to make myself very plain in this regard. I do not believe that you can have planning and engineering and research separated from the operating job. One of the things that is most difficult to cope with, as a practical matter, is to have your researchers design things that are not readily suited for operational use.

COORDINATION BETWEEN RESEARCH, DEVELOPMENT, AND OPERATIONS

I do want the Assistant Secretary of Defense for R. and D. to have control of the funds and to have the Joint Chiefs of Staff man reporting to him, but I visualize a research and development association all the way down the line and into the operating groups so that operators and researchers will be alongside of each other. The operating groups are charged with doing the job and the engineers with designing or developing up to the full capability of the art. They do not do the operating work and they do not do the maintenance work, but they have to be closely associated together, and I think the thread should come from the Assistant Secretary of Defense for research and development and extend all the way down the line.

Mr. WEISL. Would that principle apply to basic research as well as applied research?

Mr. HYLAND. Not to the same degree. I think the function of the Assistant Secretary for R. and D. should be dual in capacity. On the one hand, he should have the association with the operating commands, and on the other hand, he should have the job of sponsoring basic research to whatever degree is felt to be necessary by the military.

Mr. WEISL. You are a member of one of the advisory committees with Dr. Killian, are you not?

Mr. HYLAND. Yes, sir.

Mr. WEISL. And I take it, as you testified, that you have, as we all have, a high respect for his ability and scientific background.

Now Dr. Killian, in testifying before the Armed Services Committee, had the following to say about research and development:

The military services have not distinguished themselves in the initiation of radically new approaches to weapons systems. There are striking exceptions to this, but it would hardly be expected that the really radical approaches would come from within the services. They must originate in the creative basic research that takes place in the universities, and other institutions where the fundamental new ideas are most likely to be generated.

Do you agree with that?

Mr. HYLAND. I agree with that. The reason that I want the Assistant Secretary for R. and D., a man with the Joint Chiefs of Staff and the other R. and D. agencies down the line is so that when these

do come in from the universities or other places, that they will have immediate access to whatever appropriate level in the Department of Defense is necessary to put them into effect.

I agree that many of the radical ideas do come from outside of these agencies. Some of them come from within. But in all cases they should have the capability of going to an effective spot and proceeding right up the line, as may be necessary, in order to get the right kind of attention.

AEC AND MILITARY MUST BLEND EFFORTS FOR EFFECTIVE WEAPONRY

Mr. WEISL. Hasn't the Atomic Energy Commission demonstrated that a separate agency can develop advanced weaponry, in the form of atomic weapons, outside of the military service?

Mr. HYLAND. That is only true in part, and again, I say, that was a very special case. The weaponry, it seems to me, in the last several years is beginning to become much more effective as you get a tight association between the Atomic Energy Commission and the military people who have to use the weapons.

There has been a certain amount of—there was for a long time a certain amount of pulling and hauling but in my opinion the effectiveness of atomic weapons is becoming extremely enhanced in recent years as the operating and design agencies get put together.

Mr. WEISL. Then, I take it, you would not advocate at this time the placing of basic research as distinguished from supporting or applied research, in a separate agency with liaison with the military forces?

Mr. HYLAND. I think you have got to do both.

There are certain kinds, and I must say that this business of having completely independent basic research is not the answer to everything. There is a certain amount of independent research necessary and I think that it can be promoted through the National Science Foundation.

On the other hand, there are types of research which are still basic, but which you can see are going to be required within the Military Establishment, and that kind of basic research can be put out through such agencies as the Assistant Secretary or through the Office of Naval Research which has done a magnificent job of sponsoring research in both industrial and institutional agencies.

Mr. WEISL. Excuse me, sir, are you finished?

Mr. HYLAND. It is difficult in a short session to cover all of the ways in which this should be done.

Mr. WEISL. Yes, sir.

Did you hear the testimony of Mr. Gross, the president of Lockheed, this morning?

Mr. HYLAND. Yes, sir.

Mr. WEISL. And did you hear him testify that if private industry were given the discretion to go ahead with a weapons system without interference, after the idea was designed and frozen, that they could bring it in in half the time and in many instances at half the cost, if they were not interfered with constantly by the procedures and the rules of the Department of Defense.

Mr. HYLAND. Well, I agree in part with what Mr. Gross said. I don't believe that—and I guess I am trying to put words in his mouth now, that he meant to go quite that far.

There are many occasions in the course of the development and the manufacture of a weapons system where there comes a new invention, a change, the need for coordination with some other parts of the military service that makes it wise and expedient to change a course of action.

I think that it is necessary at all times to keep the thread not only of the particular weapon that you are working on but also the association with many of the other complex functions that have to be taken into account in the Department of Defense.

So that I would be reluctant to say that we undertake to do, for example, the Polaris program and not have the close association which is necessary with the operating departments of the Navy or the new intelligence reports that they come in with, and that we should just give them a carte blanche to go ahead without any subsequent supervision and association.

SUPERVISION WITHOUT DOMINATION—THE IDEA

Mr. WEISL. I am sure Mr. Gross does not mean they would have no supervision but what he meant was, I think, that they should be interfered with as little as possible and there should be someone on the job who could say "yes" or "no." Isn't that right?

Mr. HYLAND. Precisely.

Mr. WEISL. Without waiting for months or sometimes years?

Mr. HYLAND. That I agree with.

Mr. WEISL. You pointed out that already we have discretion and responsibility vested in men like General Schriever and Admiral Raborn.

Now, does General Schriever have any discretion over how many Atlases or Titans should be produced?

Mr. HYLAND. He does not.

Mr. WEISL. Or what money should be spent for research and development?

Mr. HYLAND. He does not.

Mr. WEISL. What responsibility and discretion does he have?

Mr. HYLAND. He has the discretion for the conduct of the design work within the scope of the funds that have been allocated to him.

Mr. WEISL. But as far as the speed of the development, or the speed of the production, or the tooling for production, or the go-ahead, he has no authority.

Mr. HYLAND. That is correct. He should have it.

Mr. WEISL. That applies to Admiral Raborn as well.

Mr. HYLAND. Quite right.

Mr. WEISL. What would you recommend?

Mr. HYLAND. What I have stated in my plan.

Mr. WEISL. Sir?

THE CAPTAIN, NOT THE PURSER, SHOULD DETERMINE THE COURSE

Mr. HYLAND. I recommend a change in the organization of the Department of Defense, and I recommend that we get away from the policy of having the purser telling the captain of the ship what course and speed he should steer in heavy weather.

Mr. WEISL. You point out that, Mr. Hyland, that this complicated structure that has developed was foreseen by James Forrestal some years ago?

Mr. HYLAND. That is correct.

Mr. WEISL. What did James Forrestal recommend?

Mr. HYLAND. Unification of the services.

Mr. WEISL. In what way?

Mr. HYLAND. By bringing the Army, Navy, and Air Force under central management.

Mr. WEISL. Under central management?

What does this mean?

Mr. HYLAND. A single Department of Defense that would be able to dictate to them their overall approach to a military problem.

Mr. WEISL. Do we have that now?

Mr. HYLAND. We have the three services each more or less given general interest in the overall defense program.

When I was a member of the guided missiles committee as I have been for a good many years, there were many times in the development of new weapons where each of the services would come in with a proposal for this particular weapon, let's say, for example, the long-range or the intermediate range ballistic missile.

Then we would send a paper up to the Joint Chiefs of Staff, the Security Council, the Secretary of Defense, what are the roles and missions involved so that we can decide which service has the best capability to do this job.

We were never able to get a reply. So far as I know the roles and missions involving intermediate or long-range ballistic missiles has to this day not been completely resolved.

Mr. WEISL. And you would give the Secretary of Defense power to resolve that?

Mr. HYLAND. Exactly.

I think he has the power, if he would exercise it.

Mr. WEISL. He has the power today but you say that he has not exercised it?

JOINT CHIEFS PULL FOR INDIVIDUAL SERVICE

Mr. HYLAND. I think one of the difficulties has been that the Joint Chiefs of Staff which really are three equal individuals, each promoting the interests of his own service to a degree, they each have said "We need a ballistic missile" and so we have three of them.

Mr. WEISL. Yes; and do you believe that?

Mr. HYLAND. Until we correct that situation we are still going to have competitive weapons.

Mr. WEISL. And you believe that if your plan of reorganization were adopted rivalry and service competition would be greatly reduced?

Mr. HYLAND. Reduced; that is right.

Mr. WEISL. In your statement you very properly point out that research must be funded over a longer period.

Mr. HYLAND. Correct.

Mr. WEISL. You believe that to be an absolute necessity, do you not?

Mr. HYLAND. No question about it.

Mr. WEISL. If you want to have any kind of scientific research?

Mr. HYLAND. Absolutely.

Mr. WEISL. And I believe your recommendation is that it be funded for a 3-year minimum?

Mr. HYLAND. A minimum of 3 years.

Mr. WEISL. A minimum of 3 years.

Now, Mr. Hyland, is there any subject matter that you would like to discuss that has not been covered by my questions?

Mr. HYLAND. No.

Mr. WEISL. Have you anything to suggest, Mr. Shank?

Mr. SHANK. No, sir; except particularly to endorse the continuity of research because that is the area that I am particularly charged with and consequently most conscious of the present deficiencies.

Mr. WEISL. You believe or do you believe, that research both basic and applied, should be under an Assistant Secretary for Research?

Mr. SHANK. Certainly; as a functional responsibility with additional provisions for certain key types of research to be conducted directly without going through the services.

It is not necessary to have it all there.

I frequently say that research is where you can find it, and we dare not waste any research that we can find, but it is essential to prevent it from overlapping, doing the same job repeatedly, and to make sure that there are no holes left between the various agencies, and that is the important function for having a centralized research agency.

Mr. WEISL. Mr. Chairman, my time is up. Thank you.

Senator STENNIS. Mr. Hyland, I think you made a very valuable statement here. I want to call attention of the committee to the fact that we have to vacate this room at 5 o'clock.

If necessary to complete the examination of this important witness, I will be glad to go elsewhere. I thought it might be possible for us to complete it within 5 by a little effort.

I am going to waive my time with this mere statement of special commendation on one point.

That is your recommendation here for long-range financing for long-range research. I think unless we do that we will never get started on a proper basis, and I hope that we can evolve a definite plan.

There are many other points in your statement here that I think are very valuable, the fact I do not mention them is certainly not because I overlooked them or discounted them.

Senator BUSH?

Senator BUSH. I would like to be reminded when I have used, say, 7 minutes. I will cut myself down in accordance with the suggestion made.

Senator STENNIS. If more time is needed, we will get it.

SCIENTIST ALONG WITH THE CHIEFS OF STAFF

Senator BUSH. May I say, first, that I am very much encouraged by the statement that Mr. Hyland has made. I think it is an excellent statement, and I think he has made some very constructive suggestions, and very much in line with the thinking that I have been doing, and the conclusions I am gradually coming to, as a result of these hearings, particularly respecting the organization of the Defense Department.

You speak of a full-time voting member being added to the Joint Chiefs, in the nature of a person who is a nationally respected and

recognized scientist. That is a novel suggestion. We have not received such a suggestion as that heretofore, that I know of.

I ask you this question:

Could not this function be done by the Assistant Secretary for Research and Development whom you propose with the proper backing of the Secretary of Defense? In other words, would this particular individual that you have set up, or reformed, perhaps, by name, at least, wouldn't he fill that bill on the Joint Chiefs in your plan?

Mr. HYLAND. There is a little bit of difference between the two functions, as I see it. The Assistant Secretary of Defense for Research and Development, as I see the picture, is going to be charged with the operation of a certain amount of basic research work, and more particularly associated with the overall Secretary of Defense problems.

I kind of look upon the Joint Chiefs of Staff as an operating agency, as distinguished from a management agency, and I would like to see the operating agencies sort of coordinated in that group.

Senator BUSH. He wouldn't have time for that, under your setup?

Mr. HYLAND. No.

Senator BUSH. Your conception of your laymen scientists on this military board is one who would give full time to it?

Mr. HYLAND. That is right.

Senator BUSH. I see.

Now, in your proposal about the Joint Chiefs, Mr. Hyland, you solved the authority of the Chairman by giving him three votes, so that under your setup, if he has any one of the other four people on your proposed board, that would be the decisive voice. You wouldn't go so far as to make him the decisive voice?

PARAMOUNT PURPOSE WOULD BE TO GET DECISION

Mr. HYLAND. I would be willing to go that far. I would be willing to go any length to get decision.

Senator BUSH. You are familiar with the fact that under the Rockefeller Committee recommendations, that they did give him that, in effect a commanding position?

Mr. HYLAND. That's right.

I do not want to insulate him, however, from the research and development influence, which is why I put in this setup.

I have seen this adverse influence too many times.

Senator BUSH. You speak of the very effective, though competing and overlapping, organizations under Generals Schriever, Medaris, and Admiral Raborn. That is something that has impressed me somewhat in our studies in the last few months.

How are you going to correct that, though, if you are going to have each one of the services developing weapons for itself? Do you visualize that under your reorganized plan it would be handed to roles and missions in weapons development from the Joint Chiefs?

Mr. HYLAND. Precisely.

Senator BUSH. You do.

So that they would be told, "This is your business."?

Mr. HYLAND. "This is your business, and you go ahead and do it."

Senator BUSH. In other words, Air Force wouldn't decide for itself what its missions were and what its development program was, but that would be handed to it as an assignment?

Mr. HYLAND. That is correct.

Senator BUSH. That is the first sound recommendation on that, I think, that we have had, and I congratulate you on making such a bold suggestion.

I think, Mr. Chairman, that that is all I am prepared to ask at the present time. I yield the floor, Mr. Chairman.

Senator STENNIS. Thank you, Senator.

Senator Symington?

SECRETARY SHOULD TAKE DEFINITIVE POSITION ON WHICH MISSILES ARE
TO BE DEVELOPED

Senator SYMINGTON. Mr. Hyland, to be sure I understand, what is your plan exactly from the standpoint of a further unification of the services?

Mr. HYLAND. The further unification comes about, No. 1, by having the Secretary of Defense exercise many of the powers that are already granted to him; and No. 2, by the operation of the Joint Chiefs of Staff having a decisive position rather than let's say a three-headed position.

Senator SYMINGTON. Let's take the first point first.

What power has the Secretary of Defense got today that he is not exercising?

Mr. HYLAND. I believe that he has the power, for example, to resolve roles and missions questions which the Joint Chiefs of Staff do not resolve, and further, I think he has the power to say to the Army "You are the one to develop the IRBM," but that has not been stated as yet.

I mean it has not been said.

Senator SYMINGTON. I think you will find that the National Security Act of 1947, as amended, forbids him to have the power to establish roles and missions, but is your analysis of the power that he has not exercised on missiles the fact that we have both the Jupiter and the Thor, for example?

And you think there should be only one?

Mr. HYLAND. That is right.

Senator SYMINGTON. Is that right?

Mr. HYLAND. I think there should have been only one from the beginning.

Senator SYMINGTON. I see. Only one IRBM.

Mr. HYLAND. That is correct.

Senator SYMINGTON. Now what was the second point about the Secretary's power or the second point about unification?

Mr. HYLAND. The second point about unification is that I believe you will get it if you give the Joint Chiefs of Staff a decisive role, so that any question that comes up to them is not looked at from 3 different points of view and the decision made with respect to the interests of the 3 separate services.

Senator SYMINGTON. That could only be done, could it not, by giving one of those people a final decision which presumably would be the chairman of the Joint Chiefs.

Mr. HYLAND. In effect that is what I do by giving him three votes, to resolve any controversy himself.

Senator SYMINGTON. Then you would give him decision? Is that correct?

Mr. HYLAND. That is correct, I give him the bulk of the decision-making capability.

Senator SYMINGTON. And therefore you would follow the Rockefeller report?

Mr. HYLAND. In effect.

SECRETARY FORRESTAL REQUESTED ENLARGED AUTHORITY

Senator SYMINGTON. Right.

Now, for the record, I don't think you were quite right about Secretary Forrestal's thinking. Prior to the passage of the National Security Act, he and the others who opposed those like General Eisenhower, who wanted the administration at the top, rested their case on the desire for coordination instead of administrative authority. However, Secretary Forrestal had only been in the job for a few weeks when he came frankly to the President and the Congress and stated that he did not have enough authority to handle the job, and as the result of that, in 1949 the Secretary of Defense was given more authority.

I only bring this up because it has gotten much worse instead of better. Now it looks as if we might be going to attempt to solve this problem again simply by putting up money and perhaps blaming a few individuals instead of changing the system in the Pentagon Building to at least something comparable to the system that the average good business has. As an experienced executive, would not you agree that it has to be changed more in line with the American theory of how to run a business?

Mr. HYLAND. There is no question about it at all.

Senator SYMINGTON. And in your operation at Hughes and the work which you have been doing which has run over the years into billions of dollars, have you not been forced to waste a great deal of money because of the current setup in the Pentagon Building today?

Mr. HYLAND. Yes.

Senator SYMINGTON. Thank you, Mr. Chairman.

I have no further questions.

Senator STENNIS. Senator Bush, do you have any further questions?

Senator BUSH. No, sir; I do not think so.

Senator STENNIS. Counsel, do you have any other questions?

Mr. WEISL. No, sir.

Senator STENNIS. Since we have just a few minutes, there is one sentence down here at the bottom of page 7, the last sentence in the paragraph, if you will find that please, page 7 on our copy, which is the mimeographed copy, refers to your reduction in the staff.

You say, "Therefore, I would suggest 20 percent across the board as the first step."

Now what staff were you referring to there?

Mr. HYLAND. The staff in the Pentagon on the Secretary of Defense level. I am referring to the same thing, for example, that Trevor Gardner referred to, these overlapping committees and staffs and review groups that now exist.

Senator STENNIS. That still would leave this layer on top of layer just the same.

It would just be a thinner layer, is that right?

ARBITRARY CUT WOULD PRECEDE STUDIES LEADING TO FURTHER CUTS

Mr. HYLAND. A thinner layer. You cannot do everything at once, Mr. Chairman. The first thing I would do is to make an arbitrary cut. Then further management studies leading to a simplification of structure and further cuts as time goes on.

Senator STENNIS. That would be your leadoff, and then from there you would be more systematic?

Mr. HYLAND. Yes, that is right.

Senator STENNIS. All right; are there any other question?

Any other points either one of you wish to make?

Again we want to thank you for your very valuable contribution here. I am sorry you gentlemen had to wait as long as you did.

Mr. HYLAND. That is quite all right.

Senator STENNIS. That is a part of the picture of operations here. We feel that you have given us some very helpful and valuable testimony and concrete suggestions in many instances, and they are not as plentiful every day as they could be.

We thank you again and if there is nothing further you are excused.

Is there any other matter now to come before the committee today?

Without objection, the committee now will take a recess until tomorrow morning at 10 o'clock in this chamber for an open hearing when the witnesses are expected to be Mr. Lanphier, Mr. Hurley and Mr. Collins.

Mr. Vance will give you further information on the witnesses.

(Whereupon, at 4:50 p. m. the committee was adjourned, to reconvene at 10 a. m., Thursday, January 16, 1958.)

INQUIRY INTO SATELLITE AND MISSILE PROGRAMS

THURSDAY, JANUARY 16, 1958

UNITED STATES SENATE,
PREPAREDNESS INVESTIGATING SUBCOMMITTEE
OF THE COMMITTEE ON ARMED SERVICES,

Washington, D. C.

The subcommittee met, pursuant to recess, at 10 a. m., in the Old Supreme Court Chamber, United States Capitol, Senator Lyndon B. Johnson, chairman of the subcommittee, presiding.

Present: Senators Johnson (presiding), Stennis, Kefauver, Symington, Saltonstall, and Bridges.

Also present: Senators Smith (Maine), Bush, and Barrett.

Edwin L. Weisl, chief counsel; Cyrus R. Vance, counsel; Gerald Siegel, associate counsel; Solis Horwitz, associate counsel; Daniel F. McGillicuddy, associate counsel; Stuart P. French, associate counsel; Edward C. Welsh, staff adviser; and K. E. BeLieu, staff of the Committee on Armed Services.

Senator JOHNSON. The committee will come to order.

The committee is delighted to have as its first witness this morning Mr. Roy T. Hurley, the president and chairman of the board of the Curtiss-Wright Corp.

Mr. Hurley began his career more than 40 years ago as an aircraft engine mechanic. He was an inspector for aircraft and engines for the Army Air Corps during World War I.

Mr. Hurley has been president of Curtiss-Wright since 1949 and chairman of the board since 1950.

He was a member of the Eberstadt Task Force Committee with the Hoover Commission in 1948. He also served during that year as a consultant to the commanding officer of Wright-Patterson Air Force Base.

The chairman is pleased to have a witness of Mr. Hurley's experience appear before the committee and give us the benefit of his views.

I am sure, Mr. Hurley, that we will find a great deal of value in your testimony.

Will you please come forward to the witness stand and raise your right hand and take the oath, Mr. Hurley.

Do you solemnly swear that the testimony you give this committee will be the truth and the whole truth?

Mr. HURLEY. I do.

Senator JOHNSON. Have a seat, Mr. Hurley, and we will be glad to have you testify.

Mr. HURLEY. I have with me Mr. Vaughan, our Washington representative.

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Senator JOHNSON. Will he give any answers?

Mr. HURLEY. No, sir.

(Mr. Hurley's biography is as follows:)

BIOGRAPHY OF ROY T. HURLEY

Mr. Hurley was born in New York City on June 3, 1896.

He began his career as an aircraft engine mechanic with the B. F. Sturtevant Co., Hyde Park, Mass., in 1916. He was inspector of aircraft and engines, New York City district office, United States Air Force, 1917-18; chief engineer with the B. G. Aircraft Spark Plug Co., New York City, 1921-27.

He was vice president and general manager of the Moto-Meter Co., Long Island, from 1927 to 1931, and later with the Hurley-Townsend Co., New York City from 1932 to 1935.

He was vice president for manufacturing, Bendix Aviation Corp., Detroit, Mich., from 1935 to 1947. He was a director of manufacturing engineering with the Ford Motor Co. from 1948 to 1949.

Upon joining the Curtiss-Wright Corp., at Wood-Ridge, N. J., he became president in 1949 and chairman of the board in 1951 which position he holds at the present time.

He was a member of the Eberstadt Task Force Committee with the Hoover Commission in 1948 and a consultant to the Wright-Patterson Air Force Base commanding officer in 1948.

Senator JOHNSON. Mr. Hurley, it is a pleasure to welcome you to our deliberations.

Do you have a prepared statement?

TESTIMONY OF ROY T. HURLEY, PRESIDENT AND CHAIRMAN OF THE BOARD, CURTISS-WRIGHT CORP.

Mr. HURLEY. Yes, sir, I have. I would like to read it if I may. It is a brief one.

Senator JOHNSON. Do you have copies of it?

Mr. HURLEY. Yes, sir.

Senator JOHNSON. Have they been distributed?

Mr. HURLEY. Yes.

Senator JOHNSON. Proceed, Mr. Hurley.

Mr. HURLEY. Mr. Chairman and gentlemen. I would like to preface my reading of these remarks with a statement that I base my suggestions or recommendations on the premise that the Army, Navy, and Air Force be maintained at combat strength while the research and development of the new weapons systems go on.

The full implications of the second Russian satellite and the testimony of many responsible individuals has made it very clear that we in America are spending a lot of money for which we are getting too little, too late so far as defense is concerned.

There is no point in wasting this committee's time by repeating all that has been said and implied about failure. I would rather offer the elements for a practical solution, taking into consideration people and their capabilities, based upon my many years as a manufacturer and my experience as Deputy Chief of Ordnance for a period during World War II. This experience leads me to the recommendation of the following changes in our defense procurement policies and practices:

1. The Chiefs of Staff should be charged with advising the Secretary of Defense quarterly on the types of war they expect they might be called upon to fight accompanied by presentation to the Secretary

of Defense of a list of the requirements for such wars. These requirements should be integrated for the three services and should be developed by operating and technical personnel in the services.

2. The Secretary of Defense should be charged with the responsibility of determining the policy and programs for the development and production of the requirements as listed by the Chiefs of Staff. To properly carry out his responsibilities, the Secretary of Defense should be reinforced with an executive committee of 7 members, 4 of which are from industry. These men from industry should be representatives of all branches of industry.

They should be men of the caliber of the president and chairman of the board of United States Steel Corp., the president and chairman of the board of RCA, the chairman of the board of General Motors, and the chairman of the board of du Pont de Nemours.

There should be one military member of this committee. This man should be a general officer representing the highest authority in the procurement services of the military departments.

The Director of the Budget should be a member of this committee and there should be a member of this committee appointed by the Armed Services Committees of the Congress.

At present there are many duplications at the staff and Secretary level in the Pentagon of the procurement services of the Air Materiel Command, the Army technical services and Navy bureaus. These Pentagon duplications should be eliminated and the services permitted to integrate their activities on a cooperative basis.

3. When the Secretary of Defense and his executive committee present the defense program to the Congress, and money is appropriated to meet the requirements of that program, funds should be made available directly to the procurement authorities in the military departments for immediate utilization for the purposes for which they were appropriated. There should be no further delays, reviews or checks by the military superstructures in the Pentagon or on the staff of the Secretary of Defense.

The Secretary of Defense should organize his personnel so that it can police the use of these funds for the military procurement organization to assure that moneys are spent effectively and for the purpose of obtaining the highest quality at the lowest cost. This policing should be administrative from the point of view of getting results, instead of being administrative from the point of view of slowing down the process of procurement.

4. The procurement services of the military departments should be instructed to put emphasis on quality and costs, not on low profits and the Government control and furnishing of facilities. This cannot be achieved without a change in the present philosophy that any commissioned officer can do a first rate job of procurement because he is protected from any and all mistakes by procurement regulations. Such protection produces high costs, long lead times, and poor quality of defense products.

RECOMMENDS OVERHAULING OF PROCUREMENT REGULATIONS

A review of procurement regulations should be made by a committee to be established immediately. This committee should consist

of men of the type of Lt. Gen. L. H. Campbell, United States Army, Retired; Adm. George Hussey, United States Navy, Retired; and Lt. Gen. K. B. Wolfe, United States Air Force, Retired. Others similarly qualified by experience in both the military and industry are available.

Under present contractual procedures, Government contracting practices plus specifications, plus cost-plus-fixed-fee type of contracts, have resulted in the Government's responsibility having been diverted from that of obtaining quality at low cost to that of being responsible for the delays and the too-little-too-late production of defense items. The procurement regulations should be revamped to place upon industry the responsibility it should and will take if permitted to do so. The responsibility on Government should be made specific to obtain quality at a reasonable cost. Competent companies should be encouraged to become strong and to become independent of Government controls of requirements for facilities.

A good example of the problems facing the military services and the contractor which may help provide a better understanding of the foregoing recommendation is our experience with the big extrusion press leased by the Government to Curtiss-Wright and located at our Buffalo plant. In September of 1949 the Chief of Procurement at Wright Field requested that we find a method of eliminating welding from steel propeller blades then being purchased by the Government. A few months later we succeeded in extruding a steel propeller blade without welding, with improved physical properties, and with promises of large cost reductions.

We submitted a proposal to the Government which called for Curtiss-Wright to provide the press with its own funds if the Government would allow us to charge the costs incurred to products being produced and delivered to the Government. We were confident that the savings would be sufficient to pay for the press in a short period of time and that thereafter the Government would continue buying products of a superior quality at a lower cost.

Under Government practices this could not be done and the Government decided to provide the press itself. We agreed to this and soon found ourselves enmeshed in the well-known big press program with its delays, holdups, investigations, and reinvestigations, and requests for innumerable reports and conferences.

The net result was that under Government auspices we did not get the big press into operation until 1956—7 years after the program was started. The press is and will continue to be a success. It can and will provide products the Defense Department must have and will save money, but the 7 years of preparation was an expensive and unhappy period for Curtiss-Wright and the Government.

Three years ago the Air Force stated that the United States was behind in the use of steel alloys and asked that industry do something to improve these metals to catch up with the Russians. Through the use of the extrusion press, Curtiss-Wright demonstrated that steel alloys can be produced that show up to 100 percent improvement in fatigue strength and impact strength and that bearing durabilities can be substantially increased. In other words, almost any steel part of any missile or engine can be improved by new techniques developed by Curtiss-Wright. However, these techniques are not being used

and the facilities needed to round out the processes developed are still being investigated and weighted by Government agencies.

GOVERNMENT FACILITIES FURNISHED TOO LATE

Under the contractual procedures now in use, the Government furnishes facilities. Government facilities are generally furnished after the contractor has a contract or a need for such facilities. They are, therefore provided too late and do not take into consideration fully the design characteristics of the product.

If Government contractors were allowed to develop strength through contractual procedure and thus be able to furnish their own facilities, the design and development of products would be better fitted to the facilities and very substantial cost savings and much shorter lead times would result.

Another disadvantage of Government-owned facilities is the fact that when the Government contracting officer has established large facilities in a company, he feels compelled to put business where he has put facilities. These decisions are frequently made on the basis of expediency and justification rather than on the basis of efficiency or lower costs or higher quality.

It is also of interest to note that the United States was not combat ready at the beginning of World War I, World War II or the Korean incident. Combat readiness was obtained after the wars had started. The nature and location of these wars were such that people other than the Americans bore the brunt of providing the United States with the time needed to become combat ready.

It is commonly agreed that we will not be given such buffer time for the next war. The next war will be won or lost by the quality of our day-to-day planning and procurement. It is also generally agreed that we will have to fight a war when it occurs with the military organization then in being. This requires the direct opposite of the present philosophy of procurement. It requires that we stop buying aircraft and missiles having inferior performance as soon as better aircraft and missiles are available.

Three years ago at a high level meeting with the Air Force we were told that all powerplants being purchased and built in the United States were obsolete by Russian standards with the exception of two types. To date all procurement has been directed toward what was then stated to be obsolete and no procurement has been initiated for the two types that were stated to be superior.

The delay in proceeding with advanced engines can be charged to the policy of not providing for engine developments until they have an airframe requirement for the same. Thus, the engine that provides the performance of the airframe is held back until an airframe requirement develops.

We heartily endorse the President's program to use the skills of our friends and allies whenever we can and we quote the President in his state of the Union message to the Congress.

It is wasteful in the extreme for friendly allies to consume talent and money in solving problems that their friends have already solved—all because of artificial barriers to sharing. And we cannot afford to cut ourselves off from the brilliant talents and minds of scientists in free countries. The task ahead will be hard enough without handcuffs of our own making.

To implement President Eisenhower's very fine suggestion, we have reviewed our types of products in the world and prepared a program to reduce lead time on certain items by some 2 years, to reduce costs by hundreds of millions of dollars, and to improve substantially the quality and performance of these devices. The only thing necessary to have the benefits mentioned is for the President's policy to be implemented.

In concluding, it is emphasized that none of these changes require legislation; they require only the will to do.

I have prepared brochures on these products that I offer as examples. The nature of the information disclosed might be considered classified, and I would like to present these brochures and ask that they be considered or that the questions that are asked regarding the subject matter be asked in a closed session.

Senator JOHNSON. Thank you very much, Mr. Hurley, for your statement. Do you desire to have this supplemental statement that you submitted to the House committee made a part of this record?

Mr. HURLEY. It is not necessary, sir. The information there supports my statement and gives examples that will make it easier to understand my recommendations.

Senator JOHNSON. Do you have sufficient copies of this supplemental statement to provide each member of the committee with one?

Mr. HURLEY. Yes, sir.

Senator JOHNSON. Will you see that they are provided to our staff so that each member may have one?

Mr. HURLEY. Yes, sir.

Senator JOHNSON. Thank you very much, Mr. Hurley.

Counsel, will you proceed.

Mr. WEISL. Mr. Hurley, the state of the Union message which you referred to is the last state of the Union message made by the President?

Mr. HURLEY. Yes, sir.

Mr. WEISL. And you say that if that statement is implemented by action, it will save the country years of lead time and also hundreds of millions of dollars.

Now who can implement that statement?

Mr. HURLEY. It can be implemented, sir, by the Defense Department.

SUGGESTIONS FOR IMPROVEMENT HAVE BEEN MADE TO DOD

Mr. WEISL. Have you made suggestions over the years to the Defense Department looking toward the implementation of that statement even before the statement was made?

Mr. HURLEY. We have.

Mr. WEISL. For how long a period of time?

Mr. HURLEY. We have put this policy into practice.

For example, some years ago we brought the Sapphire, an English engine, into the United States, and at the moment I believe all of the naval aircraft that are in combat position with the fleet, all of these airplanes are powered with this English engine built in the United States.

Now it was not a popular thing to do at that time, and we were subject to some criticism and doubts in the minds of many people in procurement and planning.

As a result of the President's statement, we have examined 3 or 4 items that give promise of very large benefits from the point of view of lead time. There are some products in being that we are about to undertake the development of. There are products that improve the performance of the defense weapons system that we now have, and the brochure that I believe would be considered classified we have prepared to present to the committee, sir.

Mr. WEISL. You will present those implementations of the statement to the Defense Department.

Mr. HURLEY. Yes, sir. I would like to state, sir, that we have been working on a very close relationship with English, Canadian, and German firms now for some 7 years, so this is not a new idea or one that we have just given a short period of thought to. We have been very deeply involved in the problem and we are well prepared to support our suggestions.

Mr. WEISL. Have you had any success in the past in trying to put over such ideas with the Defense Department?

Mr. HURLEY. Only in one instance, the case of the Sapphire engine.

Mr. WEISL. How many suggestions have you presented outside of the Sapphire engine?

Mr. HURLEY. There have been two failures, following the Sapphire, so we have gotten 1 hit out of 3 times at bat, sir.

Mr. WEISL. If those two suggestions had been accepted would you say lead time could have been cut and hundreds of millions of dollars saved?

Mr. HURLEY. I am sure lead time could have been saved; as to substantial sums of money, I would have to go back to those projects to give you the actual savings.

AS CONSULTANT TO AIR FORCE HE CRITICIZED PROCUREMENT

Mr. WEISL. Mr. Hurley, you served on the Forrestal Committee or Board which investigated the Defense Department, did you not?

Mr. HURLEY. Yes, sir.

Mr. WEISL. What conclusions and recommendations did this Forrestal Board come to?

Mr. HURLEY. The conclusions of the task force that I was attached to with Mr. Forrestal were largely those of my own findings. I had criticized the procurement planning as a consultant to the Air Force at Wright Field, and I found myself involved in being a Government employee at Wright Field criticizing Government employees in Washington.

That got to Mr. Forrestal's ears and he called me down here and I came here on loan from the Ford Motor Co. for about 6 months, and I spent that 6 months investigating the mobilization planning and procurement planning of the whole Defense Department.

At that time we found, sir, that the requirements were not adequately set up. The items that would become critical in the event of an emergency were not properly prepared and planned for, so that any plan we had would be delayed by these critical items.

We found that the personnel who had the job to do were not allowed to make the decisions they had to make.

For example, the procurement people at Wright Field were told that machine tools were of no interest to them, that the machine tools for mobilization would be provided by people in the Pentagon.

The people in the Pentagon were not familiar with what was required for production and procurement and therefore we had this divided authority, and we were getting nowhere.

We predicted at that time in the event of another emergency there would be an extreme machine tool shortage. The Korean episode demonstrated that that prediction was right. It was evident then, Mr. Weisl, that the things that are worrying us now were taking place, and that this situation was building up.

At that time I published a brochure and distributed it in which I predicted we were taking a risk, but at that time it fell on barren ground because there was no compelling thing that worried people or caused them to be afraid, frankly.

This was in 1951.

Mr. WEISL. And no one paid very much attention to it in the Defense Department.

Mr. HURLEY. That is right, sir.

Mr. WEISL. Were any of the recommendations to remedy these evils that the Forrestal Committee found in the Defense Department accepted?

Mr. HURLEY. The difficulty I would say—yes, Mr. Forrestal was terribly concerned about this thing. He was very much upset and it struck him very deeply. Those of us who had been living with this for years, and I started in this business some thirty odd years ago, became a little callous to it. He was not of that callous nature, and he tried very sincerely to solve it. The problem, sir, was to get people to understand the problem. When you reviewed the Defense Department at that time from Mr. Forrestal on down, you had a lack of what I call the man familiar with hardware, and not being familiar with it, not having to be responsible for producing it, he could not understand some of the things you wanted to do.

Now there was acceptance of this in areas in the services. For example, General Rawlings authorized my investigation of the procurement forms and papers, and I made that investigation at his request at Wright Field and distributed it among his people. It was an effort on General Rawlings' part to implement some of these things. But the Government is a big thing, sir, and when you have the overlapping authorities and you try to convince all of them, it is a very difficult one, and I am convinced now, sir, unless you can eliminate many of these overlapping authorities, we will again fail to make the changes we should.

Mr. WEISL. What bodies would you eliminate, Mr. Hurley?

Mr. HURLEY. Well, in running a business, sir, the first thing you want to know is what is the thing you are going to make and sell. That is the requirements that should come from the Chiefs of Staff. They should highlight those that are critical.

Knowing what you want, the thing to do is to call in competent people that know how to get those things and that is why I suggest this committee to help the Secretary of Defense, the head of a steel

company, the head of a chemical corporation, the head of an electronics company. These are the companies that are going to have to make these things and when they are being considered, the plans are laid for them, they should be brought in and take a part, take some responsibility in this planning. It is unreasonable to expect an Air Force officer or a naval officer to have the complete knowledge necessary to do this planning. As soon as that plan is agreed to and the Congress accepts it and provides the funds for it, those funds then should go directly to the procurement officer, and all these delays in lead time would then be eliminated.

In my humble opinion you will take a year and a half to 2 years out of the lead time. It has been pointed out to me that to change the budget thinking you have to change the law, and therefore I am in error in my presentation, but I call your attention, sir, that I suggest that the Director of the Budget be a member of the Secretary of Defense's Committee, so when the program is put together and planned, he is a party to it, and if he then presents it to the Congress, he should not hold up those funds.

In presenting that plan he has been a party to it and he has recommended it, and those funds then should be made available directly to the procurement officer.

Now the procurement officer at times will make mistakes, and I again think this is where the Secretary of Defense as a manager should come in and should police it to see that those mistakes are corrected; or, if someone requires punishment or replacement, that such punishment or replacement should take place.

Mr. WEISL. Did the Forrestal Committee on which you served recommend any changes in the organization structure of the Defense Department?

Mr. HURLEY. We did not at that time, sir. I was not charged with making recommendations in the organization of it.

One change did take place. I believe the incident that I referred to, I might tell you, with Mr. Forrestal, was the main reason for eliminating the Munitions Board and that one change did take place; but my study was not carried on, sir, to the point of making recommendations as to the organization.

Mr. WEISL. In other words, of all those recommendations made by the Forrestal Committee on which you served and on which I believe Mr. Eberstadt served—

Mr. HURLEY. That is right, sir.

Mr. WEISL. Only one recommendation was put into effect?

Mr. HURLEY. Only one, sir; yes, sir.

Mr. WEISL. And that was the elimination of the Munitions Board?

Mr. HURLEY. That is right.

Mr. WEISL. Now you point out in your fine statement that a review should be made by men like General Campbell, Admiral Hussey, and so forth.

Is not that what Mr. McElroy is doing?

The papers announced that he has appointed or asked General Bradley and Admiral Radford and General Twining, Chief of the Joint Chiefs of Staff, to advise him. Isn't that another advisory committee such as the one you suggest?

Mr. HURLEY. Yes, sir; but I was a little—I approached it from another point, sir. I selected three generals who had the personal

experience of the frustration of trying to get hardware, who were in the frontline, getting this hardware—General Campbell for the Army, Admiral Hussey for the Navy, and General Wolfe for the Air Force.

Now these men know where the problem lies, and they know how to correct the situation. They do not have to go to staffs. They do not have to take time to make an investigation and build up a program. I know from personal experience with these men they know what to do. There are others like them, but I selected one from each service.

THE PROBLEM OF GETTING RECOMMENDATIONS ADOPTED

Mr. WEISL. Mr. Hurley, this committee and its staff have studied at least 57 reports of 57 different committees, committees headed by men like Dr. Killian, Forrestal, and others, and we found that practically none of the recommendations made in those committees have been put into effect.

Can you give us some suggestions as to how a recommendation, once it is made by a committee, can be put into effect and into operation?

You point out in your statement that 7 years of delay took place on the press, for instance, that you convinced everybody was the kind of a press to use.

Now could you give this committee some suggestions as to how we can put into effect the recommendations that are made by committee after committee?

Mr. HURLEY. I believe my recommendation of a committee of industry working with the Secretary of Defense is the best answer to that.

This industry is going to have to do the job when war comes, and they are well-qualified to recommend what facilities we need and when we need them.

Now they are not going to recommend facilities that they are going to have standing idle in their plants. They know what that means to them from the point of view of costs.

They also, sir, if they make mistakes, will be in the position of being subject to criticism and contempt in the eyes of the public, and they are going to avoid that.

They are the qualified people in this area, and I think they should be made a part of the scheme of things and take the responsibility that goes with it. I think it is unfair to ask a commissioned officer who may come back from combat duty let's say in Korea, as I remember one, and he is then sent over to a committee of the Congress to defend the machine-tool program.

That is unreasonable and unfair, so I would put industry in that position. I might be criticized for conflict of interest, but there is more conflict of interest in the current situation than would occur under these conditions.

Mr. WEISL. But, Mr. Hurley, many of these committees had men of industry on them. General Sarnoff, the head of an industry having a billion dollars volume a year, was on many committees. You were on the Forrestal Committee. Mr. Eberstadt, who is a director of about 20 of our largest industrial companies, was on several of the committees. We have had the head of General Motors, Mr. Kettering, as the missiles czar.

None of these recommendations were put into effect. What can we do?

Mr. HURLEY. There is one thing wrong with all these committees, sir.

Mr. WEISL. Yes, sir.

RECOMMENDS PERMANENT SUBCOMMITTEE

Mr. HURLEY. They come and go. I am suggesting a committee that stays here. It is like our Secretary for Air. I have been at Curtiss-Wright, I believe now, close to 9 years. I think there have been seven Secretaries of the Air Force. They just about got acquainted with their problems of their office and then somebody else comes. If you appoint the committee I am suggesting, sir, they should be a permanent committee and take a permanent responsibility.

They are of the type of man who will say if you have got the job to get it done I think they will do it, but if you just give them the job of doing—criticizing or recommendation, they will criticize and recommend and go home so it is that business of permanence or temporariness.

Mr. WEISL. You suggested as a permanent committee the president of the board of United States Steel, the president of the board of RCA, the chairman of the board of General Motors and the chairman of the board of Du Pont. Those are among the largest suppliers of our weapons. Could they possibly serve on a permanent board to advise the country where and how to buy weapons when they are the weapons suppliers?

Mr. HURLEY. These are the fundamental plants for procurement, sir. They could attend meetings here very easily, say, twice a quarter. They could build and would as they do at home in their own organization, as I do, build a small staff under them to supply the information they need and I for a moment would not be afraid for the competition that such men would develop for my own company, for example. This is a very basic thing, this planning for the requirements, and we must use the best brains and the most competent talent we have.

Mr. WEISL. You point out that the system of giving out cost-plus-fixed-fee contracts is wrong, that it violates the incentive system on which our free-enterprise way of life is built. Would you care to tell the committee what kind of a system ought to be used, in your opinion?

Mr. HURLEY. Well, I recommend strongly the use of contracts to allow the contractor to do research and development work on his own, to provide facilities on his own.

When the Government asks a contractor to bid on something that has been developed by somebody else, and it comes as a new device, and there is no fundamental research and development work in the plant of the contractor, he has not acquired his facilities, and so forth, and the facilities were not laid out as the item was designed or developed, he then looks for machinery and for facilities after he gets his contract or about the time he gets it. The design and facilities are not well matched.

If you allow this strength I refer to to build up in a company, the companies will be more interested in bidding on fixed-price contracts or incentive-type contracts that are quite different from the present cost-plus-a-fixed-fee contract.

In one of the brochures I furnished I draw a comparison between the 14 aircraft companies during the war and 1 automobile company, and if the committee has the time to look at those 4 charts, you will find that during the war the automobile company became strong and the aircraft companies became weak.

Mr. WEISL. Mr. Hurley, you point out in your statement that 3 years ago the Air Force stated that the United States was behind in the use of steel alloys and asked that industry do something to improve these metals to catch up with the Russians. That was 3 years ago, and you say that you made a suggestion as to how your company could improve these alloys and catch up or even surpass the Russians and yet nothing has been done about it today.

Mr. HURLEY. Well—

Mr. WEISL. Even since sputnik.

Mr. HURLEY. We are trying to satisfy the various layers of authority that there is a need for these improved alloys and their properties, and members of the Air Force are also trying to prove this thing, but it is in this system of approvals and disapprovals and reports and investigations that is referred to, and it is a matter of 2 or 3 years to carry this thing through.

Now, we have got a setup where you have got to prove there is a requirement for something of this kind.

DEVELOPMENTS ACCEPTED ON LIMITED BASIS

Mr. WEISL. In other words, for 3 years you have recommended a way of improving these alloys, and even since sputnik nothing has been done about it?

Mr. HURLEY. Well, there has been something done.

Mr. WEISL. What has been done?

Mr. HURLEY. But not enough. We have made shafts for very unusual engines. We have made many things for the Atomic Energy Commission, and we have actually done some things with the equipment and the processes. But it has been on a very limited basis. We not only should have the plant running at full force, but there should be 3 or 4 other companies doing the same thing we are doing, and the properties that we have developed in gears and shafts and housing and things should be used by almost every maker of missiles or engines or aircraft.

The ideal thing would be for Curtiss-Wright to furnish the facilities itself so we are not involved in a Government plant for Government procurement and regulations.

Mr. WEISL. Mr. Chairman, I am advised my time for questioning is up. Thank you, Mr. Hurley.

Senator JOHNSON. Thank you very much, Mr. Hurley.

Senator BRIDGES.

Senator BRIDGES. Mr. Hurley, in your opening remarks you stated that our first priority was to maintain our forces in being. It is your opinion that we cannot sacrifice our present strategic deterrent forces merely to place a greater emphasis on missile development or upon these space projects which will not become operational for some time to come?

Mr. HURLEY. Yes, sir.

GETTING DECISIONS IS GREAT PROBLEM

Senator BRIDGES. Mr. Hurley, I gather that your observation is one similar to mine so far as the Defense Department and its various units are concerned. The greatest problem, or certainly one of the more important ones is to obtain decisions more quickly; is it not?

Mr. HURLEY. Yes, sir; that is correct.

Senator BRIDGES. According to many reports which have come to my attention, in your own operations, you have had a good deal of successful experience in cutting redtape, reducing the lead time, and getting into weapons production.

Do you think that can be done on a national basis if people have the will to do it?

Mr. HURLEY. Yes, sir.

Senator BRIDGES. And if they can get quick decisions?

Mr. HURLEY. Yes, sir. And I think we demonstrated that during the last war. I was called in to get ammunition, and I did the very things I did in my own company. And if war comes again and I was called back again to get an item, I would put the same thing into effect.

What we did was make decisions and place responsibilities. We are doing it in our own company, but in this thing that has been built up in the Defense Department, decisions are not made and responsibility has not been placed. It is distributed over too many people.

Senator BRIDGES. Many of the witnesses who have testified before us have indicated that our lead time is much too long particularly as compared to the Russians. One of the major reasons for the prolonging of lead time is the inability to get a decision, or to know to whom to go to get a decision, or the lack of authority in that person to make the decision once you have found him?

Mr. HURLEY. Yes. It is very difficult to find any one person who has the authority and can make the decision. So it becomes a compromise and it becomes the result of reports and investigations and checks and rechecks being made by many people, many boards and committees.

When they are appointed to pass on something, you cannot blame them for wanting to pass on it, but when you get too many of them, there are bound to be differences of opinion, there is bound to be conflict of thinking and attitude and so forth, and it just results in lack of action.

Senator BRIDGES. Do you agree with me that many of the people in the military service, whom you approach in the course of business, are willing to assume the responsibility for decision-making?

Mr. HURLEY. Yes, sir.

Senator BRIDGES. However, he is handicapped because he does not have the authority. He is, in some way, strangled in his effort to make quick decisions?

Mr. HURLEY. Yes, sir. It has been my experience, and I have served with the military, when they are given the authority and support, they will get the job done, and they will make the decisions.

Senator BRIDGES. Isn't it true that we must have responsible people who have the authority to say "Yes" or "No" and then go ahead?

Mr. HURLEY. That is right, sir.

Senator BRIDGES. And this problem of a complicated process before a decision can be made is one of the basic causes for prolonging the lead time?

Mr. HURLEY. Senator Bridges, if we made automobiles the way we would make weapons, I think the automobiles would cost \$30,000 a piece. Can you imagine putting an automobile into production and having a dispute in the committee about the front axle or the rear bumper or the brakeshoe on the right rear wheel and have that throw the whole program out of gear? When it takes 2 years to make something, a thing you could make in 1 year, it costs them twice that much because you are supporting your whole organization for 2 years to produce it instead of 1 year.

Senator BRIDGES. That is all.

Senator STENNIS. Mr. Chairman, I hate to interrupt, but I believe we could hear the witness better and the press could, too, if he would utilize that microphone.

Mr. HURLEY. I will get closer to it, sir.

Senator JOHNSON. Thank you, Mr. Hurley. Senator Kefauver.

Senator KEFAUVER. Thank you, Mr. Chairman.

Mr. Hurley, I was interested in the statement on page 7 of your prepared statement that the powerplants in our planes were obsolete by Russian standards except for two types. However, there had been no work toward developing these two types.

Does that situation persist at the present time?

WE ARE STILL DEPENDING ON OBSOLETE ENGINES

Mr. HURLEY. Yes, sir; largely, and the brochure that I am making available to the committee that is of a classified nature describes such powerplants and what to do about them, sir.

Senator, when the procurement officer is limited in a powerplant to developments and facilities that he needs for the particular airplane in production at the moment, he is prevented from authorizing a contractor to go ahead and make the advances and the improvements and the changes that both the Air Force man and the contractor know are going to be needed a year or two down the road.

He has to wait on that development until the requirement comes for such a thing. He is not allowed to move forward as free industry would move forward and make the changes and do things that he knows are coming.

Senator KEFAUVER. We heard the same thing in connection with rocket motors, and your point is that we ought to have provision to anticipate the kind of airplane motors that we will need in years to come and be doing something substantial toward developing them looking toward that day; is that your point?

Mr. HURLEY. Yes, sir. Senator, in our own commercial business, I tax all of our general managers a certain percentage of their sales and tell them they have got to go out and earn that percentage and I take it away from them and then I use that for research work to advance their products and make them reduce their costs. When I am building an engine for the Government, I think the Government should tell me, "Take 2 percent of your contract and see what you can do to make that contract better or cheaper and report back what you will accomplish with that 2 percent."

But the 2 percent is not there; it is taken out. We have got to find a contract and we have got to convince a lot of people we should do this and it always comes late.

Senator KEFAUVER. Has there been any change in Government policy since sputnik or up to the present time that will enable this kind of development looking toward the future to be done in connection with plane engines or any other kind of products that you know of?

Mr. HURLEY. None to my knowledge, sir. The procurement regulations and the programs have not been changed. They may be changed as a result of some of these new moneys being made available. But to my knowledge, there has been no change.

Senator KEFAUVER. This is not any limitation of law. It is just a procurement limitation?

PROCUREMENT REGULATIONS PREVENT EXERCISE OF JUDGMENT

Mr. HURLEY. Yes. And in many cases, Senator, the procurement regulations are holier than law; it is rather an iron-bound document and was developed in coordination with the purpose of protecting Air Force people and military people in Government practices. It in effect replaces their judgment.

Senator KEFAUVER. Is there anything you can say that is not classified with reference to who developed these advanced type of motors and what the status of their development is at the present time?

Mr. HURLEY. I could only refer to the products that we are thoroughly familiar with; and that product, sir, is classified and it would be very difficult for me at the moment to decide what I could say that would not be classified.

Senator KEFAUVER. We know something about the jet planes and the new Russian transport, and I have been fearful that in that line they might put another sputnik on us unless we get started with making better jet engines of our own. Is that your feeling?

Mr. HURLEY. I agree, sir. We took some remote measurements on the Russian transport in the United States, and from those remote readings, we were able to translate it back into what we expect to find in that engine, and I would say that it is quite likely that we may be surprised in our commercial transport service as well as military service.

Senator KEFAUVER. Is it your information that that engine is now in substantial production in the Soviet Union?

Mr. HURLEY. That is the information I have, sir. It is of course, remote and it comes through several channels, but the development of that engine, the airplane, is in general use. I have talked to many people who have flown in that airplane and are familiar with it.

Senator KEFAUVER. Well, I certainly think you made a very good point that we ought to have some method so that we could be developing things for the future rather than just for their present use and need.

Mr. HURLEY. Yes, sir.

Senator KEFAUVER. Thank you very much, sir.

Senator JOHNSON. Thank you, Senator Kefauver. Senator Flanders? Senator Smith.

Senator SMITH. I have no questions, Mr. Chairman.

Senator JOHNSON. Senator Stennis.

Senator STENNIS. Mr. Hurley, I have read your statement and listened to your impressive statement here. I think you have been fully examined on it. It is constructive enough and I will content myself with one point here that you referred to.

At the bottom of page 2, point 3 under it, on the mimeographed copy, you say that when Secretary of Defense and his executive committee present the defense programs to the Congress and money is appropriated to meet the requirements of that program, funds should be made available directly to the procurement authorities in the military department for immediate utilization for the purposes for which they were appropriated.

Now, that question has come up several time, and it was stated here yesterday afternoon by Senator Saltonstall that he understood from the Budget Director that the Budget Bureau had not held up funds in any instance, military funds. That whatever holdup there had been was bound to come from the Comptroller or the budget department of the Department of Defense itself.

Now, do you have any personal experience on that matter or personal knowledge about that situation?

I do not necessarily ask this question critically. I just want the record to show what the actual facts are.

Mr. HURLEY. Senator, the holdups occur in all those areas. We have had experience where it has been someone in the Pentagon, the Air Force, some in the Secretary's office.

You have a philosophy that has been built up that the way to get action is to hang onto the money and that is a delaying tactic and a frustrating one, and it causes people who work hard to plan a job, it causes them to say, what the hell is the use. The thing to do is when you decide you are going to go ahead with an airplane or engine, go ahead. And if the man has made a mistake, then go after him. Do not stop him in the tracks the way you do by holding up his funds.

Senator STENNIS. What I am impressed with from you manufacturers—you have had actual experience on this very point you are discussing.

Mr. HURLEY. Constantly, yes.

Senator STENNIS. I think you gave a wonderful illustration here a while ago about the automobile, not to argue or hold up every point about a fender or axle or bumper or some particular item which slows down the automobile production and which makes the cost maybe five times more.

Mr. HURLEY. That is right.

Senator STENNIS. I thank you very much for your testimony.

Mr. HURLEY. Thank you, sir.

Senator JOHNSON. Thank you very much, Senator Stennis.

Senator Case.

Senator Bush?

Senator BUSH. Mr. Chairman, I have no questions.

Senator JOHNSON. Senator Symington?

Senator Barrett?

Senator BARRETT. Thank you, Mr. Chairman.

Mr. Hurley, I am interested in the experience that your company had with this big extrusion press which you mentioned in your statement.

Mr. HURLEY. Yes, sir.

Senator BARRETT. You indicated there that in September 1949 procurement asked you to find a method if you could for eliminating the welding on steel propeller blades and that you went ahead and came up with the answer, that you made a proposal to use your method there and charge them for the blades, taking into consideration the fact that you had invented the system but the procurement agency indicated it could not do it under the Government practices.

Now tell me this: Does that method still prevail down in the Defense Department.

PRESS COULD NOT BE CHARGED AGAINST PRICE OF PRODUCT

Mr. HURLEY. It prevailed all through the Government services, and it is a hard one for me to understand, and I have plotted some of the data in connection with it.

That press, when we produced the first model of this propeller blade—it looked to us as though we could design and build that press and install it in 2 years for a cost of about $3\frac{1}{2}$ to 4 million dollars, which we were willing to do at Curtiss-Wright, but we had to find a way to get that back. It was a large sum of money. The normal thing to do in business was to put that into the price of the product.

We could have built that press and charged it to the price of the product, and because of the savings the press would make, it would not raise the price of the product, and in 2 or 3 years the press would be paid for.

Therefore it looked as though we could reduce the cost of the product 15 or 20 percent.

But there is policy that has been developed that there is something wrong about charging off or writing off properties against the cost of product, and in one of my brochures that I presented to you, I show the history of certificates of necessity, and I believe the ore boats, for example, were given certificates of necessity, averaging about 95 percent—90 percent for ore boats, 65 percent for aircraft.

Now we all know that an ore boat is going to be in use for 20 years. We all know that aircraft facilities are obsolete in 5 years, so someone has the feeling that this writeoff of things against the cost of product is some kind of a free gift or something you steal or something that is dishonorable, something wrong about it.

Senator BARRETT. I cannot see anything wrong about it but I am just a country boy and I cannot understand the position of the Defense Department. I notice that Defense leased it from Curtiss-Wright; is that right?

Mr. HURLEY. Pardon me, sir.

Senator BARRETT. Your statement refers to the big extrusion press leased by the Government.

Mr. HURLEY. Yes, sir; the Government furnished it and in order to support it we entered into a lease with the Government and said, "We will go out and get commercial business to support this and we will pay you money out of this product, so you get back money for your

press and you are not giving us a gift that we will use for commercial business."

Now the very thing we are doing under that lease, of charging to our commercial products the cost of the press and making the money available back to the Government, the Government says you should not do on a Government product. Do I make myself clear, sir?

Senator BARRETT. Indeed, and the cost probably is more doing it under the Government method than doing it under your method.

Mr. HURLEY. It costs us \$7 million, sir, because of time.

Senator BARRETT. And the Government lost about 6 or 7 years of time, too.

Mr. HURLEY. The product that the press was designed for is no longer required and in the process of 7 years it was remodified and redesigned so it would be available for today's products.

If we had not done that the press would have been a waste of money.

Senator BARRETT. The final question I would like to ask you is this: Are these practices still going on down in the Defense Department? Are we still being held up by those procedures?

PROCUREMENT POLICIES DISCOURAGE ACQUISITION OF EQUIPMENT

Mr. HURLEY. The policy of discouraging writeoffs is still in effect, and disallowing writeoffs.

Senator BARRETT. And is it slowing up the program?

Mr. HURLEY. Yes; it has the effect of preventing companies going ahead with the acquiring of facilities and having them ready so that when a product is needed we have got the facility and we can go ahead.

It is one of the real factors in lengthening lead time.

My own opinion, sir, if I could, I would have three of those presses in this country. When you can increase fatigue strength 100 percent, impact strength 100 percent, increase the strength of the gear tooth 100 percent, that should be put into every missile and every engine that we have got just as quickly as we can, and other companies should have presses the same as Curtiss-Wright and we all should be producing these higher quality products and we all should be charging the cost of the press to the product, not to something else.

We should not have to convince 6 or 7 committees that this is a good idea. If there is not a metallurgist on the committee he does not know what you are talking about when you talk about fatigue strength and impact strength.

Senator BARRETT. That is the way free enterprise operates in every other field; isn't it?

Mr. HURLEY. That is right, sir.

Senator BARRETT. Thank you very much.

Senator JOHNSON. Thank you, Senator Barrett.

Senator Saltonstall.

Senator SALTONSTALL. Mr. Chairman, I am sorry I was late. I shall read your statement, sir. Thank you.

Mr. HURLEY. Thank you.

Senator JOHNSON. Mr. Hurley, I have a question or two I would like to go over with you. In your statement you say:

At present there are many duplications at the staff and secretary level in the Pentagon in the procurement services of the Air Materiel Command, the Army

technical services, the Navy bureaus. These Pentagon duplications should be eliminated and the services permitted to integrate their activities on a cooperative basis.

I have two questions: One, will you please elaborate in some detail on the first sentence in that paragraph, and, second, tell us why the services are not permitted to integrate and who is not permitting them to integrate.

In short, No. 1, tell me what you are talking about specifically when you refer to the numerous duplications at the staff level. That is a very general statement, and the committee would like to know specifically what you have reference to.

The second question is, Who is it that prohibits the services from integrating, assuming they want to?

LACK OF KNOWLEDGE BY PENTAGON OFFICIALS DELAYING FACTOR

Mr. HURLEY. Mr. Chairman, we have talked about the big press. About 3 or 4 months ago I stopped in Wright Field and talked to some of the people there, explained to them the advances and improvements we have made in various models, and I was told "Hell, these additional facilities to round out that press to full production, you should have those facilities and we will approve it."

I came back from New Jersey and a couple of months went by and I found that before that piece of paper could become effective it had to come to the Pentagon, and it had gotten part way up in the Pentagon and it went back to Dayton for additional information because the man in the Pentagon did not understand what it was all about.

So we came down and talked to some people in the Pentagon and that seemed to go again, and then it got back to Wright Field again and we supplied more information, and at the moment I am not sure that the piece of paper is either in the Pentagon or back at Wright Field.

The point I would like to make, sir, is that the general officer at Wright Field whom I talked to and who knows his business, he should be allowed to make that decision.

He should not have to come back here and convince and sell 3 or 4 other people.

There seems to be no end to the people who have to be sold and convinced.

Senator JOHNSON. That theme has run through almost every witness' testimony.

What you are saying is we either ought to put the Pentagon at Wright Field or Wright Field at the Pentagon; but somebody ought to have the authority for decision, and it ought to be the Government's contracting officer at a place where these decisions are made.

Mr. HURLEY. Yes, sir.

Senator JOHNSON. Where the procurement decision is arrived at, is that right?

Mr. HURLEY. Yes, sir. General Rawlings is the commander at Wright Field. I think every one knows General Rawlings and everyone respects him as a good officer, a good businessman, and so forth.

The decision is not going to be one bit better because General Rawlings has to come to 2 or 3 other civilians or generals or secretaries in the Pentagon. In fact, they will deteriorate. By the time you satisfy

all these people you are going to lose something because everybody becomes frustrated, everybody gives up and says what is the use, and the compromise you wind up with is not a good one.

Senator JOHNSON. So the delay that inevitably ensues between Wright Field and the Pentagon is a very costly thing to the country in your opinion?

Mr. HURLEY. Yes, sir; the same thing as between the Navy—

Senator JOHNSON. And if we could exercise great care in selecting our top people in authority say at Wright Field or at the various plants over the country where we have supervising officers, if we could select our top people for those positions, and then vest them with the necessary authority and full responsibility for what they did, you think we would not only save a great deal of money but would save a great deal of time.

Mr. HURLEY. Yes, sir; your lead time, your time of producing a weapon I think would be cut in two, sir, and there is a natural law that takes effect when you do this.

When you charge a man and give him the responsibility and he fails, he is in trouble and he knows it, and he is generally going to do something about it if he has the ability and capacity. But if you give him 4 or 5 crutches to lean on so that he does not have responsibility, he does not put forth his best effort.

Senator JOHNSON. But your experience has been that our problem is not at the plant or at the procurement offices or at places like Wright Field. Our problem begins after those people have made their decision and are ready to go but then they must send that decision to the Pentagon and it gets going on that merry-go-round over there.

Mr. HURLEY. Yes.

Senator JOHNSON. And that is where the delay comes?

CONGRESS PROPOSES—ANOTHER DISPOSES

Mr. HURLEY. Yes, sir. Mr. Chairman, look at what happens. When the Joint Chiefs of Staff make a decision on a weapon and the Defense Department agrees on it and the Congress appropriates the money, who the hell should be pushing it around after that? I think that if someone stops it, then you should shoot them or drown them or put them in jail or do something with them. By God, if the Chiefs of Staff and the Secretary of Defense and the Defense Department and the Congress make a decision, it is pretty bad.

Senator JOHNSON. I do not know who should be doing it, but I know that usually it is some certified public accountant and some budget officer. I do not mean the Director of the Budget but I mean in the department itself. This has happened throughout several administrations, and I think it is a very serious thing that the Congress is going to have to study and face up to. The question is whether after we have had extensive hearings, appropriated funds, and the President has approved the appropriation of those funds for those purposes by signing the bill, a budget officer down the line has the power to say: "We are going to withhold that and take it home and put it under the pillow until we decide that you need it."

I think the Congress has already made its decision and the President has made his when he approves the bill. If the President does not approve it, he ought to veto it, and send it back and give us a

chance to do something else. But once we have all taken our necessary constitutional action, it seems to me that it is not in keeping with our system to delegate to some minor official the authority to withhold millions of dollars from the defense of the Nation. I quite agree with you.

Now let me ask you this: Do you have any suggestions or recommendations you would like to make as to how we can improve our research and development?

Mr. HURLEY. Yes, sir; I have.

Senator JOHNSON. Would you care to give them in an oral statement or do you want to submit those recommendations for the record?

Mr. HURLEY. I can give you a general statement now and I can be very specific as to products off the record. I would say, sir, it is time to stop directed research. And by directed research I mean where you say to the man, "Do this, do that." The results are not very good.

Now if you direct them to get a 20 percent improvement in a missile or a 20 percent improvement in an engine, but when you direct the research along certain lines, you are in trouble, and under present procurement regulations, there is too much directed research.

You have got to give these scientists and these engineers in industry and in Government laboratories some freedom. Let them stimulate and come up with new things and encourage them for it and pat them on the back. Do not push them into a groove and say, "If you do not stay in the groove, you are out of order. The contract doesn't provide for that. It has got to be red. If you make it blue and twice as good, look out, that isn't what we started out to do."

I talked with a man yesterday who was in Russia and had talked to some of their young scientists and engineers over there. They were, on the average, of 20 to 24 years of age, and he told me the way they pay these men, and the additional advantages they give them for coming up with new ideas, and he was very much impressed. He is a Member of the Congress and he is on the Atomic Energy Committee, and there I was agreeably surprised to find not what I had expected to find, the Russians straitjacketing people up, but in this research work, just the opposite, putting the incentive out, using, if you will, the capitalistic system of getting results, paying people for doing a better job.

We have got to cut companies' loss, laboratories' loss, and I see nothing wrong with taking 1 percent or 2 percent or 3 percent of a contract and using it for research on the product as they think they can make the products better or cheaper.

WE SHOULD REWARD INITIATIVE

Senator JOHNSON. Do you think that one of our major problems then is to find a way of initiating an incentive system that will reward the daring and venturesome and the successful scientists?

Mr. HURLEY. Yes, sir. I have a device that we are building in our company that we took a license from an inventor. He originated it. It is a simulator to teach people to fly with. A Dr. Dehmelt designed, developed, and built this thing with his own money, and when he did it, no one wanted it. The Government did not want it, the airlines did

not want it. But he had the courage to build it. He put it on airplanes, taught himself to fly and built it. He had been with the Bell Laboratories and did it himself.

I finally went to Wright Field and said we have got this. We are going to drop it unless you want it. I was asked to put it into production and we did. Our contract calls for paying Mr. Dehmel 3 percent royalty. Every contract that we get for a simulator, there is a fight over that royalty. There is something un-American, unholy about that damn royalty, and it has had the effect of putting a damper on Dick Dehmel.

He makes other inventions. He is a brilliant man, but he is making them for other customers, and that is wrong. The invention and the paying for an invention is the American way of life, and I think there should be a Government policy recognizing invention and paying someone some 1 or 2 percent royalty if you use his invention. You stimulate them. This is what the Russians are doing, in effect, as I understand their nuclear organization over there.

Senator JOHNSON. Do you have any other suggestions you would like to make to the committee, Mr. Hurley?

Mr. HURLEY. No, sir. The only other ones, Mr. Chairman, are limited to these two documents which I consider classified, and we will be glad to submit them to members of the committee, and if you would like to ask me questions in a closed session, I would be glad to answer them.

Senator JOHNSON. Fine. Senator Saltonstall has a question.

Senator SALTONSTALL. Mr. Hurley, as I read rather hastily your statement and the supplemental statement one of the fundamental objections, difficulties you believe we have now is the type of contract we have to make, is that not correct?

Mr. HURLEY. Yes, sir.

Senator SALTONSTALL. It is your opinion that it is too binding on the producer, and that the profits are too low and incentives are too little.

Now that contract form was in the law, I think, drafted in 1947 and drafted, as the Senators who were here at that time, will remember, with a great deal of difficulty and after a great deal of compromise.

Now one thing you are suggesting really is to amend that law, to provide more incentives, and to permit freedom just as you were detailing to the chairman the need for more incentive for research.

Mr. HURLEY. Amending of the law will have an automatic effect on everyone connected with the contract.

They will all begin to change things. But within the law we have, I am convinced, sir, that there are very many changes could be made this afternoon if the proper person was to direct these changes.

I have experimented myself in redrafting the contracts under the existing law.

Procurement regulations were set up so that a man, say, who had been in combat or overseas duties, comes back, he can assume a desk in a military department and he can place contracts with confidence and not make mistakes and the sharpies in business cannot take advantage of them, and there are many of them and I recognize that.

It is unfair in the first place to expect him to make the contract and if you give him a contract form to use that is so bound up he cannot

make a mistake it is bound to be a contract that slows things down and does not get the results.

CHANGE IN LAW NOT REQUIRED

Senator SALTONSTALL. You think then, to use the chairmen's expression that has run through the testimony of many of the witnesses, that the law itself of 1947 is not so much at fault as the way that that law is administered and carried out at the present time.

Mr. HURLEY. Yes, sir.

Senator SALTONSTALL. So that it is an executive or administrative change you want rather than a change in the law?

Mr. HURLEY. That would be my approach, sir. When I came in the Pentagon during the war in 1941 and had to get results we did not have to ask for changes in the law. I would like to point out something, Senator Saltonstall, that is overlooked at times. It is less than 90 years ago that the first railroad went through the Sierra Nevada Mountains into California, and 90 years ago we were traveling across the country at 1 mile an hour or less.

Today in this day we are traveling 600 miles an hour and we are about to be traveling at 6,000 miles an hour. Now the world is moving very fast and we have got to find a way to understand that speed and move with it. If we don't, what happens is going to happen.

Senator SALTONSTALL. Thank you very much.

Senator JOHNSON. Thank you very much, Mr. Hurley.

Our next witness is Mr. Thomas G. Lanphier, Jr.

Mr. Lanphier, will you and your associates please come to the witness chair?

Do your associates plan to answer any questions?

Mr. LANPHIER. Yes, sir.

Senator JOHNSON. Will you all raise your right hands, please, and take the oath that is customary.

Will you solemnly swear that the testimony you give to this committee will be the truth, the whole truth and nothing but the truth?

Mr. LANPHIER. I do.

Mr. DEMPSEY. I do.

Mr. EHRLICHE. I do.

Senator JOHNSON. Be seated, gentlemen.

Colonel Lanphier, would you state for the record the names and titles of your associates.

Mr. LANPHIER. Yes, sir.

TESTIMONY OF THOMAS G. LANPHIER, JR., VICE PRESIDENT, CONVAIR DIVISION, GENERAL DYNAMICS CORP.; ACCOMPANIED BY JAMES R. DEMPSEY, MANAGER OF ASTRONAUTICS DIVISION; AND KRAFFT A. EHRLICHE, CHIEF, PLANNING FOR SPACE DEVELOPMENT

Mr. LANPHIER. The gentleman on my left is Mr. J. R. Dempsey. He is the manager of the astronautics division of Convair where we build the Atlas.

The gentleman on my right is Mr. Krafft A. Ehrliche who is our chief planner for space development in satellites in Mr. Dempsey's division.

Senator JOHNSON. We are delighted to welcome you gentlemen here in company with Colonel Lanphier. I should like to make a brief statement concerning Mr. Lanphier before he proceeds with the prepared statement and then counsel will examine him.

Colonel Lanphier is, as you can observe, still a very young man but he has back of him an outstanding career as a newspaper editor, special assistant in Government, and as an aircraft company official. He has been vice president of Convair, also known as Consolidated Vultee Aircraft Corp., since 1951.

Colonel Lanphier was a fighter pilot, in 1942, and is a colonel in the Air Force Reserve. He is the holder of the Navy Cross, the Distinguished Flying Cross, and other decorations for bravery and he has served as a special assistant to the Secretary of the Air Force and special assistant to the Chairman of the National Security Resources Board, a member of the Air Staff Scientific Advisory Board to the Chief of Staff, United States Army Air Force, 1950 to 1951.

He is a member and past president of the National Aeronautical Association and also of the Air Force Association.

I have known Colonel Lanphier through the years, and his contributions to strengthen this Nation have been many and have been great.

Colonel Lanphier, we are very pleased to have you as a witness before the committee. We have no doubt but what you will make a real contribution to our work, and we will be pleased to have you proceed with your prepared statement. At the conclusion of your statement counsel will proceed to examine you first and then each member will examine you for a period of 10 minutes if he so desires.

Thank you, Colonel Lanphier.

We are glad to have you.

(Biography of Thomas G. Lanphier, Jr., vice president, Convair Corp.):

Mr. Lanphier was born in the Panama Canal Zone of United States parents on November 27, 1915. He has a bachelor of arts degree from Leland Stanford University, 1941. He was an editor for the Idaho Daily Statesman from 1945 to 1949. He was a special assistant to the Secretary of the Air Force, 1949-50; a special assistant to the chairman, National Security Resources Board, 1950-51.

He has been vice president of Convair, also known as Consolidated Vultee Aircraft Corp., since 1951.

He was a member of the Air Staff Committee on National Guard Policy, 1949-49, and a member of the Scientific Advisory Board to the Chief of Staff, United States Air Force, 1950-51.

He served as a fighter pilot in the Army Air Force in the South Pacific, 1942-43; was a director of fighter operations and training, 72d Fighter Wing, 1943-45. He is presently a colonel in the Reserves and has received the Navy Cross, Silver Star with Oak Leaf Cluster, and the Distinguished Flying Cross with Oak Leaf Cluster.

He is a recipient of the Air Force award for exceptional civilian service in 1948.

He is a member of the National Aeronautical Association, serving as president and chairman in 1955, and also a member of the Air Force Association, serving as president, 1947-48, and chairman of the board, 1951-52.

Mr. WEISL. Will you please talk to the microphone?

Mr. LANPHIER. Thank you very much, Senator Johnson. We will do our best to contribute.

If I may, I have a brief prepared statement I would like to read.

Mr. Chairman and members of the committee, in a recent analysis of testimony to date during this significant hearing, your chair-

man observed that, among other things, it is apparent that "our national potential exceeds our national performance."

On behalf of the Convair division of General Dynamics Corp., it is my privilege to respond to such questions as you may have regarding the capabilities of my company, as a part of that national potential, to exceed the performance currently being asked of it as a producer of weapons and weapon systems for the Defense Department.

In general terms, Convair and its sister divisions in the General Dynamics Corp. are engaged in basic research, or in the development, or in the production of manned and unmanned weapons and weapon systems for the defense of this country and its allies against attack from the air, from on or under the sea, or from outer space.

In all of these fields, we could produce many more weapon systems than we are presently being asked to deliver. And, in almost every instance, we could deliver them sooner.

Senator JOHNSON. Would you just back off and read that last sentence a little slower and let me follow you?

THEY COULD PRODUCE MORE AND PRODUCE QUICKER

Mr. LANPHER. Yes, sir.

In all of these fields, we could produce many more weapon systems than we are presently being asked to deliver. And, in almost every instance, we could deliver them sooner.

We could do more and we could do it quicker if the national attitude were more appropriate to the threat, and if more money were available.

As to our national attitude, it is true there is a popular uneasiness about our Nation's security. The sputniks have given the people at large a hint of the threat building against them. And witnesses before this committee, plus well-considered but nongovernmental reports have alluded to it generally.

But the imminence and the magnitude of the threat have not yet been stated effectively enough by the Government itself to engender a national attitude appropriate to that threat.

Nevertheless, a stepped-up effort is certainly indicated and could be accomplished if all the people who have to invent, produce, and train with the appropriate weapons systems were aware of the urgent need for them.

It is not enough for high officials of the Government to know the threat, or for a small percentage of people in the armed services and in the defense industry to know it. All the people should know it. Not only because they have a right to know it—but because the industry and the services can do an all-out job only when the tens of thousands of firms, and millions of workers and servicemen concerned universally understand the urgency of the situation and are thus inspired to use their maximum initiative and working energy per working hours and working day. And, of course, to work more days.

I would like to express concern in another general area. It has to do with what appears to be an overoptimism as to the real reliability, at early dates, of our ballistic missiles, and I am here speaking of all.

This overoptimism leads to a concurrent reduction of interest in, and, therefore, diminished development and procurement of the more conventional weapons systems upon which the force in being must rely for many years to come.

Manned fighters and bombers, and missiles associated with our defense today are suffering for attention these weeks as the more glamorous ballistic missiles of tomorrow enjoy popular emphasis in the budget now being considered.

This not only tends to demean our deterrent force against all-out war for several years to come, but also further dwindles our ability to support limited warfare—should that exigency come upon us.

In this respect it is significant that, except for a certain increase in the Atlas which was directed last month, there has been no increase, nor even replacement of cuts effected last summer, on any fighter, bomber, or other missile program with which Convair is concerned.

One other point. It is encouraging to find the Government taking growing cognizance of the vital and probably decisive role which science and research are playing in the world of today and tomorrow.

We know we have to do this to remain competitive in our business. We know our Nation must do the same to stay alive and competitive with the scientifically bolstered forces which politically and physically threaten us on the international scene.

INDUSTRY CAN DO THE JOB BUT MUST KNOW THE DANGER

As other witnesses who have appeared before you have agreed, American industry has the capability to continually invent and deliver an ever-appropriate, ever-modernized defense against the formidable enemy's threat of force, whether it be from land, sea, air, or outer space.

We can exercise this capability, however, only:

If all of us are frankly told of the size and form and timing of the danger in which we live.

If we are given a more efficient and decisive organization with which to deal for the procurement of our products for the Nation's defense, and equally important, if that organization can, as it must for our survival, develop a long-range strategic plan for our national defense. A plan related to our international policies. A plan suited to the possibilities of all-out, or of limited conflict.

I believe that if all the people were clearly informed, the resultant national attitude would afford a climate in which such matters as the appropriate plan, the appropriate organization, and the appropriate amount of money for defending ourselves would fall logically and quickly into line.

Thank you, Mr. Chairman, for the opportunity to make this statement. I have with me, as I indicated before, to assist me in answering your questions, particularly in the ballistic missile and space-development areas, two associates:

Mr. J. R. Dempsey, manager of our astronautics division, in which some 8,000 people are employed in turning out the Atlas missile, and, Mr. Krafft Ehrlicke, who is Mr. Dempsey's chief planner for space and satellite development.

Senator JOHNSON. Thank you, Colonel Lanphier, for a very direct, pointed, and succinct statement.

I shall await with pleasure an opportunity to examine you about some of the details of it. I want to commend you for facing directly

up to what I think our big problem is and saying so in a very short time.

Counsel, will you proceed with your examination?

Mr. WEISL. Colonel Lanphier, your company is engaged in developing some form of weapons systems for the Navy, the Air Force, and the Army.

Mr. LANPHIER. Yes, sir.

Mr. WEISL. And in each of those systems you point out that you could deliver them sooner and in greater quantities.

Will you please tell us what weapons systems your company is working on?

CONVAIR DELIVERING F-102 FIGHTERS AND TERRIER MISSILES

Mr. LANPHIER. Yes, sir.

In the current force in being or into the current force in being we are delivering the F-102 all-weather interceptor.

Mr. WEISL. The F-102?

Mr. LANPHIER. The F-102 all-weather interceptor. It is a supersonic all-weather interceptor. That is to the Air Force, the Air Defense Command. We are delivering to the Navy the Terrier missile, an anti-aircraft missile which they fire off cruisers in the Navy. Those are the two systems we are currently delivering to the current force in being.

In the immediate tomorrow we will be delivering in the retaliatory field the manned B-58 bomber, supersonic bomber for SAC, which we make at Fort Worth, and the unmanned retaliatory strategic system, the intercontinental ballistic missile, the Atlas.

Also in the immediate tomorrow we will be delivering the Tartar anti-aircraft missile to the Navy and an advanced version of the Terrier.

We have certain electronic products which we are delivering to the force, both missile-tracking systems used at Banana River, and airborne radar used by tactical aircraft.

We have, I imagine, we have one other major project underway for the Air Force in the tomorrow—tomorrow, the more distant tomorrow, which I imagine I am not allowed to mention the name of at the moment.

If we, as I understand we may, when we get to discussing some of these Atlas and other schedules, go into closed session I presume that it might be better to name it then.

I do not believe the Defense Department has yet allowed us to say. We are also associated with another contractor in another major program involving ballistic missiles.

Mr. WEISL. Sir—

Mr. LANPHIER. Excuse me, in our sister divisions, of course, Electric Boat has made the *Nautilus*.

Mr. WEISL. You produce the *Nautilus* and other atomic submarines?

Mr. LANPHIER. We do that in the Electric Boat division of General Dynamics, and in Stromberg-Carlson we do work for the Army defense command and naval work insofar as submarines. At San Diego we have developed and are developing water-based fighters for the Navy.

We also have under development for the Air Force at Fort Worth and have had for many years studies on nuclear-propelled aircraft and for the Navy at San Diego water-based nuclear-propelled aircraft.

Mr. WEISL. Have you been doing anything in space effort?

Mr. LANPHIER. Yes, sir; about 10 years.

Mr. WEISL. You have been doing work for 10 years?

Mr. LANPHIER. Yes, sir.

CONVAIR PRIME CONTRACTOR FOR ATLAS ICBM

Mr. WEISL. And you are the principal or the only supplier of the Atlas, the intercontinental missile?

Mr. LANPHIER. The technical phrase for our work in the Atlas is airframe manufacturer, systems integrator, and systems tester.

Mr. WEISL. You are the prime contractor?

Mr. LANPHIER. Yes, sir, we are the prime contractor.

Mr. WEISL. And you are the producer and supplier of the B-58?

Mr. LANPHIER. Yes, sir.

Mr. WEISL. For the Strategic Air Command?

Mr. LANPHIER. Yes, sir.

Mr. WEISL. Now, in any of those varied and many weapons systems, has there been any acceleration to date since sputnik?

Mr. LANPHIER. Yes, sir, in one, and that was in the Atlas.

Mr. WEISL. And to what extent has there been an acceleration in the Atlas?

Mr. LANPHIER. May I ask Mr. Dempsey to answer that?

Mr. WEISL. Mr. Dempsey.

Mr. DEMPSEY. I think I can only say that there has been some acceleration in the plans to introduce Atlas missiles into the operational force over those that existed prior to sputnik. I believe I should reserve actual numbers and dates for closed session.

Mr. LANPHIER. I think we would like to observe, however, Mr. Weisl, as we did——

Mr. WEISL. I cannot hear you, Colonel.

Mr. LANPHIER. I said I think we would also like to observe in that respect, as we did in Mr. Dempsey's letter in response to your query earlier, that we still believe that the amount of increase which has been so far activated in far less than it might be or should be.

Mr. WEISL. In other words, you say that the rate of increase for the Atlas is far less than it should be and far less than it could be?

NO OTHER PROGRAMS HAVE BEEN ACCELERATED

Mr. LANPHIER. Yes, sir, at least so far as we have any advice at the moment.

Mr. WEISL. Has there been any acceleration in the other programs?

Mr. LANPHIER. No, sir.

Mr. WEISL. Has there been a cutback in any of the other programs?

Mr. LANPHIER. Since sputnik?

Mr. WEISL. Since sputnik.

Mr. LANPHIER. No, sir.

Mr. WEISL. Could you produce more?

Mr. LANPHIER. There was one program——

Mr. WEISL. Sir?

Mr. LANPHIER. There is one program and a very significant program in which there is a confused situation in which the money is not flowing very freely and not very much of that, in a very significant program.

Mr. WEISL. In what program?

Mr. LANPHIER. It is a very significant program, the one I mentioned before, that I am afraid I cannot mention in public.

Mr. WEISL. You are going to discuss that in closed session?

Mr. LANPHIER. Yes, sir. The delay here has to do apparently with organizational problems.

Mr. WEISL. What could you do in the other programs to accelerate them?

Mr. LANPHIER. Well, first of all, by order of degree we could double our Atlas effort over what we now understand they are going to ask us to do, but which we haven't formally been asked to do.

Is that a correct statement?

Mr. DEMPSEY. Yes.

Mr. LANPHIER. On the B-58 we could afford almost twice as many B-58's by—let me check my numbers to be sure. We could accelerate our delivery of the first operational B-58 3 to 4 months and we could afford half again as many airplanes as are currently ordered by the end of 1960.

Senator STENNIS. By the end of what—1960?

Mr. LANPHIER. Yes, sir; 3 years hence.

Mr. WEISL. You are also engaged in the antimissile missile program?

Mr. LANPHIER. I have been ducking around that one, sir, but that we are.

Mr. WEISL. Would you tell the committee whether the program is being pushed fast enough?

Mr. LANPHIER. First of all, we are engaged in the Air Force approach to it. There is another, of course, as you well know, the Army approach. And I must say, the best I can say, I guess, in open hearing is that the emphasis on the program is far less than is publicly understood.

I would say, for instance, that the ratio of effort we are putting on it in our company is about one one-hundred-and-fiftieth—

Senator STENNIS. Suspend, please. I feel that the press particularly is not able to hear this witness as they should.

Mr. LANPHIER. I am sorry, sir.

Senator STENNIS. These microphones are just a little low, it seems to me. If you will, without getting too close on it, put this transmitter right in front of you, I believe it would help.

Let us have quiet as much as we can, please, for the benefit of everyone. This is very important testimony.

Mr. LANPHIER. Mr. Chairman, am I audible to you now from here?

Senator STENNIS. I think that is better; yes.

EFFORT GOING INTO ANTIMISSILE MISSILE IS INSIGNIFICANT

Mr. LANPHIER. What I was saying was I guess the best way I could publicly state the effort we are putting into our part of the antimissile missile work is about one one-hundred-and-fiftieth of what

we are putting into the Atlas missile, the sort of missile against which we are supposed to be developing a system to defend.

Mr. WEISL. If I understand you correctly, you are putting in 150 times as much effort in the Atlas program as you are putting into the anti-missile-missile program?

Mr. LANPHIER. That is right, sir.

Mr. WEISL. Could you do more in the anti-missile-missile program without in any way affecting the work in the Atlas program?

Mr. LANPHIER. Absolutely, sir.

Mr. WEISL. How much more generally could you do?

Mr. LANPHIER. Pardon me while I check my notes. About 50 times as much.

Mr. WEISL. In other words, you could do 50 times as much work?

Mr. LANPHIER. In the next year.

Mr. WEISL. Without interfering in any way?

Mr. LANPHIER. In terms of dollars.

Mr. WEISL. In terms of dollars?

Mr. LANPHIER. During the coming year, the calendar year.

Mr. WEISL. I still have difficulty, Colonel, in hearing you. It is not your fault. It is the fault of that microphone system.

Mr. LANPHIER. Is this one audible, Mr. Weisl?

Mr. WEISL. Yes. May I question Mr. Dempsey for a moment now? Mr. Dempsey, in answer to our letter asking you for suggestions for acceleration of the missile program, you stated as follows:

Recommendation 1: A greater sense of urgency must somehow be engendered in the minds and reflected in the actions of everyone in the Government and throughout the hundreds of industrial organizations directly involved in the accomplishment of the Atlas program. The vast majority of people concerned with the Atlas program are unaware of either the magnitude of the Soviets' technical progress or the imminency of U. S. S. R. operational intercontinental ballistic missiles.

Would you please comment on that to the committee?

LACK OF URGENCY DUE TO IGNORANCE OF PERIL

Mr. DEMPSEY. Mr. Weisl, I still believe it. Fundamentally, I think, as it has been covered by Mr. Lanphier in his opening statement, that there just does not seem to be an understanding in the country as to the fundamental conflict in which we find ourselves with respect to the Russians. As a result, we do not have a sense of urgency in the Nation which we had, for example, in World War II.

Mr. WEISL. May I interrupt for a moment. We asked General Schriever about that statement in your letter, and his answer was this: He said if you haven't a sense of urgency since sputnik, he doesn't know how you could get any more.

Now, would you comment on the answer that General Schriever gave? I do not think he recognized what you were getting at in your letter to me.

Mr. DEMPSEY. I think that is right. I think I was referring to a more general statement. I believe that there is certainly a sense of uneasiness in the country as a result of sputnik. I don't think there is any question about that.

But I do not think that the state of fundamental danger is understood. In fact, it seems to me that in a hundred years or so the his-

torians will be very much amazed that the Russians have told us for 30 years how they were going to conquer us, and we paid no attention to them.

Mr. WEISL. And what would you suggest the Government or the Defense Department or any other branch of the Government do to give you the information and give the industrial complex the information that they ought to have?

Mr. DEMPSEY. First, with respect to the industrial complex, it seems to me that the era of secrecy between ourselves with respect to what we understand about the Russian technology should be brought to an end, simply because it came on us in a period in which we were supposed to be ahead of them.

This is really not the situation any longer, and we might or might not benefit from knowing what the Russians have done and what mistakes they have made. But, in any case, it seems to me we should have an opportunity to know.

Beyond that, I think the Government should explain in rather clear terms to the people at large what our situation is so that our democratic process can determine what the country should do.

Mr. WEISL. And do you think that industry, various branches of industry engaged in the work should exchange information so that one industry does not duplicate the effort of the other?

THEY LIVE IN A VACUUM UNTIL CONTRACT IS SIGNED

Mr. DEMPSEY. Yes; I certainly do. I do want to make clear one thing: that there is no trouble in exchanging of information between organizations which are working on the same project or even similar projects. But that this happens after the project is underway. The time at which we are really inhibited by the need-to-know concept is prior to the issuance of contracts. During this period of time, when each of us is studying a new concept or a new idea, we cannot go to another company and discuss it because we do not have a contract which generates the need to know. And there have been instances affecting us and many other people of this nature. It does not apply to existing contracts in general.

Mr. WEISL. You make this statement in your letter, Mr. Dempsey, and I quote:

As it now is, much information useful to those active in the development of missiles is unavailable to them because they don't even know it exists, and the people who do know it exists are apparently unaware that it can be helpful in developing acceleration of our missile program.

Will you explain what you mean by that?

Mr. DEMPSEY. In that particular instance, I was concerned principally about the foreign intelligence, technical intelligence, in which it seems to me that if the Russians had successfully fired ballistic missiles before we did, then there must be some information which would be useful to those of us who are engaged in developing them.

Mr. WEISL. Who has that information?

Mr. DEMPSEY. I presume it to be available in the technical intelligence center and in the several intelligence agencies which are around town.

Mr. WEISL. And you feel that if that intelligence were communicated to the industrial manufacturers of the weapons, it could save a great deal of time?

Mr. DEMPSEY. I don't know that it could, but I sure would feel better by knowing what it was, whether that would be the case or not.

Mr. WEISL. In recommendation No. 2, Mr. Dempsey, you state:

Because of the urgency dictated by the threat, it is recommended that an attitude of greater technical risk taking be endorsed throughout the development program for the Atlas, and further in this regard, it is recommended that greater authority be given the major contractors on the program for making technical development and test-program decisions.

Would you care to explain that to the committee?

Mr. DEMPSEY. Well, with respect to the technical risk taking, I think it is simply this: that in order to go fast in a development project, one must take risks from which one expects failures.

Another way of saying that is that we have to expect failures and simply keep going. There has to be, because of the tremendous amount of money involved and the great amount of public attention involved in the ballistic-missile programs a feeling or a desire to be careful to be absolutely certain that the thing is going to work before you accomplish a test; and the simple facts are that this can never be the case. There will always be a finite possibility of failure in these missiles.

The thing one has to do is over a period of time have a large percentage of them work, and I think you do this by doing it in a hurry.

ATLAS PROGRAM NOT ACCELERATED TO THE OPTIMUM

Mr. WEISL. Mr. Dempsey, you also state in your letter:

The present planning of the Government for the operational employment of the Atlas as currently known to us is less than it could be, and if we correctly understand the Soviet accomplishments in the ballistic-missile field, the present Atlas program will tend to widen rather than close the gap between the United States and Soviet ICBM capabilities.

Would you care to comment on that?

Mr. DEMPSEY. Yes, sir. At the time I wrote the letter, there had been no acceleration. Since that time there has been an acceleration of the rate at which we introduce the missiles into the operational force, but a rate which is less than it could be. The extent to which further discussions or discussions of further acceleration are taking place within the executive branch are not known to me at the present time.

Mr. WEISL. Mr. Dempsey, since you are in direct charge of the Atlas program for Convair, I would like to ask you whether you agree with Colonel Lanphier's statement that the Department of Defense is too optimistic in predicting the availability for actual use of the ICBM's and IRBM's?

Mr. DEMPSEY. Yes.

Mr. WEISL. I do not want you to tell the extent of the optimism. We will go into that in closed session. But do you agree with the general statement that we are too optimistic in predicting when these ballistic missiles will be in practical available use?

Mr. DEMPSEY. Yes, sir; I certainly do, and I think it is a question of semantics and legalistic definition of the term "operational availability."

Mr. LANPHIER. May I intrude?

Mr. WEISL. Yes, Colonel.

Mr. LANPHIER. They are very dangerous semantics in that we will have and we will continue, for instance, in the Atlas to deliver missiles, apparently we will continue——

Mr. WEISL. I cannot hear you, Colonel.

Mr. LANPHIER. I say we have and we will continue to deliver on the schedule we have been given the Atlas missile. The tenor of my remark had to do with a reliable weapon at the time when many people currently assume it is going to be reliable. I do not believe it will be reliable at that time, and I would rather say how much later I think in closed session. But the simplest parallel I can draw is that these ballistic missiles we are talking about, the Atlas was begun 3 years ago. That is a matter of history, is it not, in the public record?

TIME EXPERIENCE WITH LESS SOPHISTICATED WEAPONS DOES NOT JUSTIFY
OPTIMISM

Mr. WEISL. We will go into that in closed session, Colonel.

Mr. LANPHIER. All I am getting at is the period of time. It is a matter of observation which the Soviets are perfectly capable of making: The period of time from when we started these things until we now say is going to be operational is approximately half the time it has been taking us to get less sophisticated weapons into the inventory in the last 10 or 15 years. It is a simple parallel.

Mr. WEISL. In other words, what you say is that we are predicting that this more complicated weapon that has never been really produced before will be made quicker than a less complicated and less sophisticated weapon like the bomber?

Mr. LANPHIER. Will be operational quicker.

Mr. WEISL. Operational.

Mr. LANPHIER. We are making them in a hurry. That has been established.

Mr. WEISL. Now, since you believe that we are too optimistic, is not the natural deduction from your belief that we should not neglect the forces in being that we now have?

Mr. LANPHIER. That is why I made the statement, sir. I realize the implications of what I said, but I make the statement because there is abroad in the land right now and especially across the street a growing disinterest in the more conventional forces upon which we have to rely for life insurance for the next 5 years.

Mr. WEISL. Do you not think then that we are taking a dangerous risk?

Mr. LANPHIER. I do, sir.

Mr. WEISL. In cutting back our Strategic Air Command or our capabilities to wage limited war if that becomes necessary?

Mr. LANPHIER. I agree with the unanimous testimony that has been made before you here over the last 2 months to that effect.

Mr. WEISL. And is not that risk even greater, from what you tell us now, that we are too optimistic?

Mr. LANPHIER. Yes, sir.

Mr. WEISL. In predicting the time that we will have these intercontinental and intermediate range missiles available?

Mr. LANPHIER. I believe so, sir.

Mr. WEISL. I would like to ask, if I may jump from person to person, Colonel Lanphier, Mr. Ehrlicke about your space program, so much as can be revealed publicly.

First, Mr. Ehrlicke, you were in the German Army with Dr. von Braun and General Dornberger in the V-2 program, were you not?

Mr. EHRLICKE. Yes, sir; that is correct.

Mr. WEISL. And you were also an officer in the tank division of the German Army?

Mr. EHRLICKE. Yes, sir; that is correct.

Mr. WEISL. When Russia was invaded?

Mr. EHRLICKE. Yes.

Mr. WEISL. You are also a scientist who was interested in space programs way back in Germany, are you not?

Mr. EHRLICKE. Yes, sir, this is correct.

CONVAIR HAS BEEN ENGAGED IN SPACE WEAPON DEVELOPMENT FOR SOME YEARS

Mr. WEISL. Would you please tell this committee briefly the matter that can be told, what you are doing, what Convair is doing in this space program?

Mr. EHRLICKE. Yes. I would like to summarize this in two essential points. We have done, as Mr. Lanphier has pointed out, at Convair for many years—

Senator STENNIS. Let us have it quiet, please. Pull that microphone more directly in front of you.

Mr. EHRLICKE. Since many years studies regarding our space flight capability. And at the time when the first sputnik appeared in the sky, we had actually a well-thought through plan which we were able to submit, and this plan aims at providing this Nation at the earliest possible time with a space operational capability using what we have and building on what we have right now.

Now, the Atlas vehicle itself, the Atlas as a booster, is something that we do have, is something which is proven and something which is powerful enough not only to eliminate the present Russian lead but, in addition to this, to reverse this lead and get us into a somewhat more powerful position in this respect.

The program itself aims at fulfilling, within a relatively short time, and the actual dates would have to be reserved for the classified meeting, at fulfilling three basic requirements for attaining space superiority at an early date. And these are, No. 1, the capability of carrying heavy loads into an earth satellite orbit, loads which are considerably greater than what has been brought up by sputniks so far.

Secondly, to enable man to operate in an orbit, in a recoverable satellite as well as in a permanent small space station.

Thirdly, to land instruments on the moon and to explore and send artificial comets out into interplanetary space over to Venus and Mars.

These last things are necessary prerequisites for us to reach out beyond earth orbits further into space. We believe this can be done with existing hardware or with hardware which is developable in a very few years.

Mr. WEISL. In other words, you do believe that if the proper backing is given and the proper acceleration introduced, you cannot only match the Russian accomplishments in putting satellites in orbit, but get way ahead of them?

Mr. EHRICKE. Yes, sir.

Mr. WEISL. Now, tell us what ought to be done to bring that about?

EXISTING MILITARY PROGRAMS SHOULD NOT BE SEPARATED FROM SPACE PROGRAMS

Mr. EHRICKE. I feel what primarily ought to be done is that we avoid some of the mistakes that we have made in the past. These are essentially two.

No. 1 is that we separate space-flight programs from existing shootable hardware programs. By "shootable hardware programs," I mean rocket vehicles under development for military programs. These two programs actually are inseparable and they should be managed and directed in a joint form so as to get the maximum use from the existing hardware.

Secondly, we should not repeat what we have done particularly in the case of the Vanguard vehicle, that we have failed to use the existing Redstone hardware for getting up a satellite.

At the present time we have again existing hardware which is quite recently proven in the Atlas booster, and we should take this booster and develop it as quickly as possible into a space-going capability, which can be done. This should be done under as much as possible existing managerial capabilities. While we are pulling ourselves out of the hole in this respect at the present time, we should certainly think about organizational improvements for the long pull in the future, but we should not let this kind of work interfere at the present time with what we can do, no matter whether it is the actual optimum that we can do or not.

The point is that we should not only optimize but accomplish things in the first place.

Mr. LANPHIER. Mr. Weisl, can I intrude on you?

Mr. WEISL. Yes, Colonel Lanphier.

Mr. LANPHIER. You asked Mr. Ehricke a question a while back and he gave a categorical answer.

Mr. WEISL. Yes.

Mr. LANPHIER. You asked if we take affirmative action we would be ahead of the Soviets and he said yes. I think he will agree with me that the Soviet rate at the moment is so much greater than ours and the likelihood they will continue with that emphasis is so certain that we are going to have to do some extraordinary things to catch them in the next, say, 5 years, let alone surpass them very far, if I may offer that amendment.

Do you accept that?

Mr. EHRICKE. Yes, I accept it very much.

FOUR STEP SPACE PROGRAM PROVIDES FOR CIVILIAN AGENCY

Mr. WEISL. You agree with what Colonel Lanphier stated? You made the following recommendation to us in the letter you wrote to us. In bringing about a better result, you said:

One, there should be a civilian organization separated from the Department of Defense, and for that matter any other department.

Two, this organization must be given by Congress a status similar to the Atomic Energy Commission or the NACA. What is the NACA?

Mr. EHRICKE. That is the National Advisory Committee for Aeronautics.

Mr. WEISL. That it must be provided by Congress with an adequate budget to manage and monitor the program.

And, four, that it must be led by a Congress-appointed chairman or director, equipped with far-reaching powers and responsibility, responsible to the President, of a status comparable to the chairman of the Atomic Energy Commission.

And that it must have, through the President, assurance of adequate Department of Defense cooperation in using military installations such as the launching and tracking facilities and in purchasing military hardware for contractors consonant with the priority of the weapons system.

Those are your recommendations?

Mr. EHRICKE. Yes, sir. this is still my personal opinion. I would like to say, however, that these recommendations are aimed at a solution offered for the long pull. We cannot look at space only as a means of military operation. We must, in the competition with the Soviet system, also look at it as a means of enhancing our technical and scientific leadership.

This is not always necessarily connected with weapons systems requirements and to the extent to which it is not connected with these requirements and to the extent to which this kind of research will go on for many decades to come, I believe that such an organization would be highly useful in cooperating and complementing the efforts on the defense in space which should be made under the auspices of the Defense Department.

Mr. WEISL. Have you brought with you for the edification of the committee some of the models that you are using in your space program?

Mr. LANPHER. Yes, sir.

Mr. WEISL. Will you show them to the committee, please?

Mr. EHRICKE. Sir, with these two models which I have—

Senator STENNIS. Just a minute. Let us give the photographers a special chance to take such pictures as they want. And then in the interest of the presentation, I will ask the photographers to suspend after they have had this chance.

DESIGN CONTEMPLATES INTERPLANETARY RECONNAISSANCE FLIGHTS

Mr. WEISL. You might explain each one of these models, Mr. Ehricke.

Mr. EHRICKE. Basically, this is a model of a vehicle capable of carrying people into an orbit and maintaining them there for a certain length of time. Then returning them to the earth.

This is the model of a small inhabitable space station. This is the model of an advanced vehicle for the operation of lunar landing parties and for interplanetary reconnaissance flights. This is actually

a little bit further out into the future. These two are a little bit more direct.

Mr. LANPHER. In fact, direct.

Mr. EHRLICHE. In fact, quite direct. They underline certain principles and these are the following. That we use boosters based on existing military hardware. There are various technical designs possible and you can optimize until you are blue in the face, but you don't get anything accomplished.

So in the first step while we still have a chance of catching up with the Russians, we must use what we do have.

This vehicle here is a design which provides for people to go out into space. And come back. This is essentially the reason for this particular shape.

Now, by doing this, you are entering a satellite orbit and circling the earth at a velocity of approximately 18,000 miles per hour.

Mr. WEISL. 18,000?

Mr. EHRLICHE. Yes, sir, 18,000 miles per hour, making one flight around the earth in about one and a half hours.

In other words, you are completely comparable to the sputnik. What we can do in such a vehicle is, first, research as to man's capability of sustaining himself in space.

Mr. WEISL. Have you done any such research?

Mr. EHRLICHE. Yes, sir, there is work going on at Convair and, of course, on a much larger scale elsewhere in this country at the Air Force and by the Navy.

Furthermore, this kind of a vehicle can serve reconnaissance purposes. That means actual supporting military operations. It is also the prerequisite for establishing a manned space station.

Now, the establishment of a manned space station has many variations and there are many things you can do. You can decide you can build a city in space or you can decide that you are just establishing a small test bed. The design of this particular space station is in the direction of establishing a small test bed using the tankage of boosters which you send up into the orbit.

In other words, the vehicle which you send out into space carrying loads, payloads up into an orbit also carries necessarily its tankage with it. Now, if the tankage is large enough, you can use this directly as construction elements for the space station, and this is an aggregation of such propellants' tanks which you convert into living space for people.

TRIP TO THE MOON USING NUCLEAR ENERGIZED ROCKET ENGINE

Now, our capability of operating in space should, first, of course, be concentrated on orbital, that means satellite, kind of capability. This is where we can actually accept Mr. Khrushchev's challenge to a race within the next 5 to 6 years and I think very successfully, but we must also look one step beyond this. We must develop at the same time while we deal on what we have, we must develop new concepts which enable us, let us say, something like 10 years from now to land parties on the moon, to decide whether we want to have a base on the moon for scientific or military purposes and to be able to conduct fast reconnaissance flights to other planets.

One of the means of doing this is a nuclear energized rocket engine. Here you use a nuclear pile to heat up a working fluid and expel it at very high speed. You get under these conditions a great saving in propellant consumption, approximately by a factor of 2 to 3 over what you can do with a chemical system.

And this here is a model of such a vehicle which is based on the accomplishments in the first phase as outlined here a moment ago.

Again, you have a set of tanks which contain the so-called working fluid; in this case the best fluid would be liquid hydrogen and which is fed into the nuclear pile to be heated up and expelled.

Now, the advantage of operating a nuclear engine in space over operating it inside the atmosphere is very, very great because in the atmosphere particularly below 100,000 feet altitude you have scattering of intense antibiotic radiation, which harms the crew and which requires very heavy shielding weight.

Once you are higher up in the outer atmosphere, which means beyond 100,000 feet altitude or in outer space, you don't have this gathering any more and all you have to do is shield so that a certain segment here is covered by the shielding and the people are located in the segment. There is no possibility for radiation to be scattered by air molecules and coming right back and harming the crew.

For this reason, the vehicle is built with a tankage and the pile back here, the tankage serving as a shielding and the crew at a safe distance on top or the forward end of the boom.

WE MUST PLAN FAR AHEAD IF WE ARE TO COMPETE SUCCESSFULLY

The power output of this engine in space can be much lower than of a similar engine; for instance, for ballistic-missile purposes. Therefore, I believe that not only, since not only we know these things, but the Russians as well, that they will most certainly spend considerable effort in developing such an engine, and, since you need many years of lead time to develop such engines, we have to have a consistent planning in this respect which allows us to start these developments, and to know what we are doing so that by the time we need it we have this kind of thing.

Now, that is what I meant a moment ago with an integrated program which permits us to use what we have right now but at the same time start thinking what we would best do after we have this, so we are ready when we want to and not only get ahead 5 years from now but stay ahead. That is the important thing.

Mr. WEISL. Dr. Ehricke, have you received any support for this program from the Government?

Mr. EHRICKE. At the present time these studies are made on company funds, sir.

Mr. WEISL. On your own funds?

Mr. LANPHER. I might say at the moment the Air Force is in the process of—they have 1 or 2 rudimentary steps underway for the next year or so of which you have been advised by General Schriever and they are in the process this month in their development command of assessing our proposal and those of other companies throughout the country, I think, with a determination by the end of this month as to which one—or which they want to go further within some sizable amount of money.

That is assuming—Jim, correct me—that is assuming the Air Force has the mission to do this.

Mr. WEISL. In the meantime, the company is spending its own funds on this program?

Mr. LANPHIER. Oh, yes.

Mr. WEISL. Dr. Ehrlicke, you believe this program to be practical, based upon your long experience?

Mr. EHRLICHE. Yes, I do.

Mr. WEISL. And do you join in that belief, Colonel Lanphier and Mr. Dempsey?

Mr. DEMPSEY. Yes, sir.

Mr. LANPHIER. To the extent of my capability, yes, sir.

Mr. DEMPSEY. I might point out that one of the reasons our company has the capability in this particular field is that we have had people working on it for 4 years back before it became popular.

Mr. LANPHIER. Actually, they have been working for about 10, because the basis he is talking about for getting it up there has been the Atlas, and we have been doing ancillary studies about the atmosphere in this respect since 1947.

And as has been testified to you before, there were a couple of years there when our own company funds kept the Atlas going.

Mr. WEISL. Colonel Lanphier, have you any other suggestion or statements to make that I have not covered in the limited time that I have had to question you?

Mr. LANPHIER. Well——

Mr. WEISL. I have not covered the field of research and development with you, Colonel Lanphier, how it should be organized, in your judgment, based on——

TIME FACTOR DICTATES NECESSITY OF DEPENDING ON PRESENT ORGANIZATIONS

Mr. LANPHIER. I would assume, I have sat as an observer in the room a number of times, and I would assume someone will ask that question, Mr. Weisl; they invariably do.

I will give a personal opinion on it now if you would like but not a company opinion.

Incidentally, Krafft gave you his personal opinion as to how this space development and research ought to be developed. I would give my personal opinion, I agree with him some years down the road. I would think in light of the fact we are going to be walking a very tight wire for our lives for the next 5 years, that it is compelling upon us as a national organization to use whatever we have, what elements we have, as quickly as we have in as integrated a way as we have without getting new organizations to get the job done. To that end as he says with a ballistic missile, the antiballistic missile, the space and antispace, all being indivisible certainly over the next 5 years, I am sure Krafft would agree with me that it might be unwise to separate them; rather it might be wiser to integrate them even more than they are in the Defense Department and eventually integrate them or relate them to a long-range space approach established somewhere outside of the Defense Department in the overall national interest including the defense effort.

Mr. WEISL. Mr. Dempsey, have you anything to add to that?

Senator SALTONSTALL. Mr. Counsel—

Mr. DEMPSEY. No, sir, I do not.

Senator SALTONSTALL. I have a question on that. It is the first time I have heard the words "antispaces program." You mean by "antispaces program" what we mean by "antimissile program"?

Mr. LANPHIER. No, sir; not exactly. The Soviets, I assume, and certainly we, have plans to establish reconnaissance stations in the outer space as soon as we can that will give you a look at any part of the world at a mean moment at any time. I am sure they are planning to do it. Anybody who has been in the rocket business as long as they have on the other side of the Iron Curtain are pros and are bound to be planning to do that.

Unless we somehow accomplish some international regulations as proposed by Senator Johnson the other day of what goes on in outer space and with the Soviet system what it is, it is probable that we will have to plan antispaces operations in order that, if they try to negate our reconnaissance, we try to negate theirs.

THE ERA OF MILITARY OPERATIONS IN THE SATELLITE AREA

There will come a time sometimes when military operations may well be carried on out in the satellite area in the form of glide bombers that the Soviets are known to be working on and we hopefully will be working on one day.

Senator SALTONSTALL. In other words, in plain language, if the Soviets or any other nation put a base up there in space, up there on the moon, or somewhere else, what you mean by "antispaces" is that we have got to have the means of attacking it?

Mr. LANPHIER. Let us say taking exception to its watching us if we don't want it to do so.

Senator SALTONSTALL. And doing what?

Mr. LANPHIER. Taking exception to its watching us if we don't want it to. And it does not have to be the moon, sir, but much closer than that and it may very well be very soon.

Mr. WEISL. Thank you very much. My time is up, Mr. Chairman.

Senator STENNIS. Gentlemen, this has been very impressive testimony. I really wish it could have been given under a little better facilities here. It seems that the committee's microphones or speakers are inadequate. I will call that to the attention of the staff. I do not know whether they belong to the committee or they belong to our friends over here, but it seems to me we need a different style that would be longer and higher and have a better range.

The committee can hear the witnesses fairly well, but I think the press has been largely excluded. This is very interesting testimony to them. It has served a great purpose in putting it out to the people.

Without taking more time, because the committee members do have appointments and a session of the Senate, I hope we can complete these gentlemen by 12:30 or their open testimony anyway, but if we cannot, why, that is all right.

Senator Saltonstall.

Senator SALTONSTALL. Colonel, may I get back into the Pentagon and down to earth here and out of this antispaces business?

Mr. LANPHIER. Yes.

Senator SALTONSTALL. Now, from what you say and from what other witnesses say, the normal channels of operation in the Pentagon are apparently too cumbersome when you want to get a specific job done. I have in mind, for instance, that General Schriever had been given special opportunities and responsibilities in the ballistic missile division, Admiral Rickover in the nuclear propulsion of submarines.

Do you feel that the type of research, the type of development that you do at your company, the Convair, can be carried on successfully under the normal channels of the Pentagon activities and operations and decision making, or do you think that they are so cumbersome that it is going to be done by a special setup?

CONTINUAL REVIEWS AN IMPEDIMENT TO PRODUCT DEVELOPMENT

Mr. LANPHIER. Well, sir, to answer the first part of the question, we are carrying on development under the current system. I believe we could carry on expedited development if the system somehow were, of the Pentagon were, somewhat parallel to the system practiced, say, in our own company and in most other companies that I know of.

In our company, for example, on the Atlas, Mr. Dempsey is responsible for the development, production, and delivery of the Atlas on schedule to the Air Force.

Once a year, he sits with General McNarney, our president, and the entire staff and his budget schedule is reviewed for the coming year, and at periods thereafter he reports in and, of course, say, today the general is aware of the progress he is making on schedule.

But once the schedule and a budget has been agreed upon, Dempsey is on his own unless he gets in trouble and then he is expected to come and ask for help when he is in trouble. He did so a couple of times and asked for help and got it. But we have been on a schedule for weeks. The general picked a man and men under him upon whom he placed authority and responsibility and took the technical and management risk that that was the right group to go with and make the schedule.

If somehow the system in the Pentagon could be adapted to that sort of approach where the gentlemen at the highest level at the Pentagon certainly determine the policy as to who in the service is going to do what, or what major weapons the services are going to go forward with, and what money was going to what service. And then gainsay such delaying factors, as the continual reviews throughout the year from month to month and from crisis to crisis and let the contractors have the dollars it might take to handle a situation, as well as responsibility for the technical changes that probably have to be made. All of these things which are surely, once a project gets into the engineering stage as the ballistic missile has been for some time, are matters of authority clear out to the operators who should be held solely responsible always including, of course, periodic assessment of what they are doing, how fast they are doing, and how well they are doing.

Senator SALTONSTALL. Excuse me. Are you through?

Mr. LANPHIER. Yes, sir.

Senator SALTONSTALL. In other words, what you say is that Secretary of the Air Force, we will say, should make the decision, and

turn over that responsibility to the proper officer, and then give him a broader leeway than he has now?

GREAT PART OF GENERAL SCHRIEVER'S TIME SPENT ON JUSTIFICATION

Mr. LANPHIER. I would say that at least, sir, but I would also add that there has grown in the last few years the additional problem of absentee management. I am speaking from the sidelines—but it is our observation, and I believe General Schriever testified that more than half of the year, for the past year, he spent here in the East justifying some element of either the Atlas or the other two programs he is responsible for, which left him less than half of the time available to use for the management of our project.

A good deal of the time he was back here he was back here to see people above the Air Force on a within-the-year basis of justifying and rejustifying various steps he wanted to take, to people above the Air Force, or separate from the Air Force.

Senator SALTONSTALL. So that this committee could make a significant contribution if it stimulated activity, or if it stimulated a revision of the methods at the Pentagon for making decisions, and then leaving people alone to carry out those decisions?

Mr. LANPHIER. Yes, sir; in two ways:

One, if you could do away with the situation that has grown up over the last 4, 5, or 6 years, where apparently a defense in depth against making decisions has been established with these committees, and levels of committees. And, two, we should clarify, clean up the system whereby we can get a policy decision relatively quickly, and then, in turn, if you can encourage the system to hand the operational responsibility out farther along the line that is, the technical and functional responsibilities, I am sure the industries would move a lot faster.

Senator SALTONSTALL. Then, another thing which I think has been brought out by a number of witnesses, including yourself, is that this research money going up and down on specific projects today, if we could work out a method by which research money for a certain project would be given, say, 3-years' clearance, or even 2-years' clearance, it would help, and then you could go ahead on a 2-year basis rather than on this up and down basis, year by year?

Mr. LANPHIER. Yes, sir.

Senator SALTONSTALL. You also said, I think, that the defense contractors should have more technical discretion in weapons development. If we do that, if we gave the defense contractor more discretion, in a way we have got to set up a competitive system, or set up 2 systems, and perhaps 2 defense contractors working toward the same objective, haven't we?

Mr. LANPHIER. Up to a certain point, sir, but beyond that point it gets pretty expensive. It is still being tried.

Senator SALTONSTALL. You heard Mr. Hurley's testimony?

Mr. LANPHIER. Yes, sir.

Senator SALTONSTALL. And Mr. Hurley said there was too much direction on research?

Mr. LANPHIER. Oh, yes.

Senator SALTONSTALL. Now, that brings up the old problem during World War II.

Mr. LANPHIER. As long as you are talking about while it is still in the research stage; yes, sir.

Senator SALTONSTALL. What was that?

COST OF PROGRAMS TOO GREAT TO PERMIT DUPLICATIVE APPROACH

Mr. LANPHIER. As long as you are talking about programs while they are still in the research and development phase, yes, but once you go into the big dollar phase of the program, that is production, I am afraid you will find modern weapons systems, getting into billions of dollars, are too expensive to maintain a duplicate approach, simply to satisfy the democratic requirement of competition.

Senator SALTONSTALL. I didn't get all that answer, but the substance of the answer was that you should allow competition up to a certain point, but beyond that point you shouldn't?

Mr. LANPHIER. Yes, sir.

Senator SALTONSTALL. There was one statement that the counsel made in the form of a question to you that I wonder if he made it accurately. He asked you the question as to whether we should cut back our production of bombers.

Now, you stated in your prepared statement that we should keep up our present strength of bombers, that they are going to be good and that we are going to rely on them for some years to come. With that I agree 100 percent.

Now, the objective is, to keep up our present strength of bombers, keep new bombers coming along, keep new fighters coming along until we know that these missiles that we are developing are going to be usable and reliable; that is true, isn't it?

Mr. LANPHIER. Yes, sir; I agree with that, both as an individual and from a company point of view, because we have the supersonic bomber and supersonic all-weather—there are two supersonic all-weather interceptors that will exceed the current force in being.

Senator SALTONSTALL. Do you know of any cutback—using that word in the strict sense—do you know of any cutback in the production lines of any bombers or fighters that we are making today?

Mr. LANPHIER. Not since sputnik; no, sir. There were some last summer and last spring that have not been restored.

Senator SALTONSTALL. That is, when the money was cut back temporarily?

Mr. LANPHIER. No, sir; this was before that.

Senator SALTONSTALL. Before that?

Mr. LANPHIER. These were reductions in the programs, back in April and May, and in the summer.

Senator SALTONSTALL. But we are developing new bombers, we are developing new fighters, so far as you know?

B-58 BOMBER AND F-106 FIGHTER PROGRAMS NOT CUT BACK

Mr. LANPHIER. I am talking about them, sir, the B-58 and 106. They are the next generation of bomber and fighter.

Senator SALTONSTALL. That is going ahead?

Mr. LANPHIER. Yes, sir.

Senator SALTONSTALL. It may not be going ahead as fast as you or I and some others would like, but it is going ahead. There is no cutback in it?

Mr. LANPHIER. Not since sputnik; no sir.

Senator SALTONSTALL. And there is no cutback in any fighter that you know?

Mr. LANPHIER. Not since sputnik.

Senator SALTONSTALL. Thank you, Mr. Chairman.

Thank you.

Senator STENNIS. Thank you, Senator Saltonstall.

Senator Symington?

Senator SYMINGTON. Mr. Lanphier, I want to congratulate you on your testimony; it is a privilege to have you before this committee.

I would like to place on the record my opinion that no living man has done more for his country, at your age, than you have. I would also like to state that, with two other people, you have done more to form my opinion on these subjects than anybody else in the last 10 years or so.

I was very much interested in your testimony, but it has been covered so completely by counsel, primarily, that I have little to ask you. I just would like to ask a couple of questions with respect to your answers to the questions of Senator Saltonstall.

There were heavy reductions in bomber and fighter production in the calendar year 1957, were there not?

Mr. LANPHIER. Prior to sputnik, in the summer our 106 program at that point, when it reaches its peak production, which is a couple of years hence, was cut in half. That has not been restored.

Senator SYMINGTON. It was cut in half?

Mr. LANPHIER. Yes, sir; the peak production.

Senator SYMINGTON. We have already had testimony that there were heavy reductions in the production of the B-52 and in the production of the KC-135 jet tanker.

To the best of your knowledge, have there been any restoration in the production schedules which were heavily cut in the calendar year 1957?

Mr. LANPHIER. No, sir, except in the ballistic missiles programs.

Senator SYMINGTON. Yes; I was talking about manned airplanes.

Mr. LANPHIER. No, sir.

ADVOCATES ACCELERATION AS TO BOMBERS AND FIGHTERS

Senator SYMINGTON. You are going ahead with these programs, but, as I understood your testimony in reply to counsel, you are not going ahead nearly as rapidly as you could, if you received more money so that you could develop our programs further; is that correct?

Mr. LANPHIER. That is correct, sir.

We could afford about half again as many B-58's by late 1960 as we are currently scheduled to afford, and we could afford them 3 to 4 months sooner. We could afford a number of fighters.

I would have to check the numbers, but it is a percentage on that order more by 1961 than we are currently scheduling.

Senator SYMINGTON. I just would like to ask one more series of short questions that I have asked other witnesses from industry.

We hear constantly that we don't want to talk about money as against security, but we always end up interpreting any program in money. We now have a supplemental budget that has been presented

by the Department of Defense, which, in my opinion, does not recognize the current danger.

However, the question that I would like to ask you:

Suppose we reversed the process and, No. 1, decided just what the danger is, to the best of our knowledge; and, No. 2, then, in effect, decided on a long-term program with a minimum of reprogramming, stopping, starting, backing, filling, cutting down, increasing, and decided to follow that, regardless, in the quickest reasonable time, and then finally organized to do it on the basis of maximum efficiency.

Based on your experience in the Pentagon Building, and the service prior to that, and in industry subsequent to that, don't you think we would end up by getting what we need for a great deal less money?

Mr. LANPHIER. Yes, sir.

If the requirements by which the Defense Department buys weapons systems were integrated, were related to an integrated plan which was, in turn, developed against or engendered from the actual threat, we could, sir, with appropriate weapons systems, even though very costly, still save money.

Senator SYMINGTON. Thank you, Mr. Chairman. I have no further questions in open session.

Senator STENNIS. We have 5 minutes, now. Senator Bush is next.

Senator BUSH. Mr. Chairman, I would like to go back to Colonel Lanphier's opening statement and ask him 1 or 2 questions.

In the opening part of the statement, and throughout, you lay great emphasis on the magnitude of the threat, the imminence and the magnitude of the threat which we face, and you say on page 2 that:

The imminence and magnitude of the threat have not yet been stated effectively enough by the Government itself to engender a national attitude appropriate to that threat.

Then you speak, later, of the overoptimism, which I think is always characteristic of us as a people, but I would like to talk about that; I would like you to develop that part about the imminence and magnitude of the threat.

Particularly, do you have any ideas or any suggestions that you could state at this time as to what we can do here in the Congress, or what the Government should do, to drive home to the people the truth about this imminence and magnitude of the threat?

Now, I think every man on this committee is fairly conscious of it. We, perhaps, don't understand the full implications of it as well as men in science and men like yourself, but nevertheless we have a will to do something about it.

What do you think we should do in the Congress, and what do you think the Government should do to try to drive home this thing that you call the imminence and magnitude of the threat?

EVALUATION OF LONG- AND SHORT-TERM RUSSIAN THREATS

Mr. LANPHIER. Senator Bush, first of all, I would like to say that I have sat in as many days as I could of this hearing, and this surely—it is obvious from the conduct of the hearings, from the very first day, that you are concerned as individuals, as well as a committee, more so I think than any time in the Congress since World War II or Korea. Surely you are doing the best you can at this moment to draw the facts out.

The threat itself is twofold, on two broad fronts. On the first, Dr. Teller, I think, articulated as well as a mortal man could the first day of your hearings, when he explained the overall sociological, political, and military threat that is involved in the broad sweep of scientific effort over in the Soviet Union that has been going on for years, and obviously is moving on out.

To the end that they may never have to fight us militarily, they may make us a second-rate nation 10, 20, or 30 years from now, simply because they have attracted the rest of the world to them with these demonstrations of remarkable scientific accomplishment that we have been unable to match in the interim, if we don't get with it.

The other element of the threat, of course, is the terrible present, and for the next 3 to 5 years, naked position in which we stand against them in terms of physical force they now have in conventional systems, and very shortly will have—if they don't already have—in the more sophisticated ballistic systems.

So when you ask what can be done to catalyze this uneasy feeling that people have into a cohesive and appropriate effort to build both a physical and a political defense against this aggressive force that is building against us, I am afraid my answer to that has to be that I can think of only one man who can really explain to the people of the United States the trouble they are in, and he is the President.

HE AGREES PUBLIC SHOULD BE ALERTED TO THE PERIL

Senator BUSH. Well, on that point, I think if one studies the President's speeches in recent years, not just this last year but for several years past, he has repeatedly referred to this period in which we live as the age of peril in which we live, and has repeatedly driven home his own apprehensions about the current situation.

I have been surprised, frankly, at the force of his statements and at the lack of effect which they seem to have had. People just don't want to be jarred into a sense of insecurity, apparently. They don't want to work more days, the way you say we should do in here, and I think you are right.

Perhaps sputnik has increased the awareness of the danger, the imminence and magnitude of the threat, but I don't really believe that it has increased it to the extent that you think it should be, by your own statement, or that I think it should be, and I think we need to do things or say things that will really greatly increase the public awareness of these two dangers, the imminence and magnitude of this threat.

Mr. LANPHIER. I agree, sir. In the first place, the paragraph is not an accusative one. It is an observation, and may I repeat it just for the moment:

But the imminence and the magnitude of the threat have not yet been stated effectively enough by the Government itself to engender a national attitude appropriate to the threat.

All of you gentlemen know what the threat is. You know it is a more serious one to us, actually right now, than we were at any time jeopardized in World War II. That is a fact, I believe, that anybody will admit.

Therefore, all I am saying is that somehow or other, a combination of the executive branch and the congressional branch and the military

people who work for them, have so far been unable to convey to the people the fact that they are in a situation, just as though it were World War II, or worse.

Senator BUSH. I certainly agree with you, and I did not take this as an accusative threat, but as a strictly constructive suggestion.

Mr. LANPHIER. And you were asking how——

Senator BUSH. I didn't take it as an accusative, at all.

Mr. LANPHIER. All right, sir.

Senator BUSH. I think it is a very, very proper observation. But I am seriously puzzled about this, Colonel Lanphier.

Mr. LANPHIER. As to how to do it.

Senator BUSH. I don't think that we have done a very good job of acquainting the people with the real imminence and magnitude of the threat with which we are faced, and I wondered if you had any specific suggestion that would be helpful in that connection.

Mr. LANPHIER. Yes, sir; I do.

Senator BUSH. Well, now, let's hear it.

Mr. LANPHIER. I guess it has to be a question to you——

Senator BUSH. Yes, sir?

Mr. LANPHIER (continuing). And that is: Why can't the people be told the simple facts that you know?

Senator BUSH. In what respect?

Mr. LANPHIER. In respect as to the current strength the Soviets have and the strength they are building over the next 3 to 5 years.

CALL FOR THE PRESIDENT TO PUT AMERICANS ON NOTICE

Senator BUSH. Well, you mean, the people be apprized of the relative strength?

Mr. LANPHIER. Yes, sir.

Senator BUSH. It seems to me, of course, that these hearings have brought out a great deal in that regard——

Mr. LANPHIER. They have.

Senator BUSH (continuing). And it is on the public record as to the relative strength which we doubtless will possess or are likely to possess 2 or 3 years from now. It seems to me we have told almost as much as we have heard in closed session.

Mr. LANPHIER. I agree with you. That is why I say in this hearing—the trouble is one of communication. That is why I suggested the President is the most appropriate individual or agency in the Government, because when he speaks, everybody listens to him that can get to a television set or a radio set.

I am sorry to say we all know that Senate hearings don't get that coverage. I think this is a combination of fault of the profession of which I was once a part, as well as the fact that the people so far just haven't—as Jim said, they haven't appreciated, as a people, the terrible ideological struggle in which they have been involved for many years. But they do listen to the President when he speaks, especially when he tells them we are in trouble. Especially if he follows that up by saying to get out of this trouble we have got to do more than we did last year and more than we did the year before. I am afraid that is not the case in this particular budget, except in the ballistic-missiles field.

Senator BUSH. Colonel, I thank you. I think your supplementary remarks here, in response to the questions, are very helpful indeed.

Mr. LANPHIER. Thank you, sir.

Senator BUSH. I know you make them with the deepest sincerity.

Mr. LANPHIER. Yes, sir.

Senator BUSH. I am very grateful to you.

I am afraid any other questions would be slightly repetitious, Mr. Chairman, so I will yield.

Senator STENNIS. All right; thank you, Senator Bush.

Senator Barrett?

Senator BARRETT. Mr. Chairman, I will be very brief. The hour is late.

At the outset, I want to congratulate you, Colonel Lanphier, and your associates, Mr. Dempsey and Mr. Ehricke, for the splendid presentation you have made today, and the fine work you are doing out at Convair in California.

Mr. LANPHIER. Thank you, sir.

RUSSIANS 2 OR 3 YEARS AHEAD ON ICBM DEVELOPMENT

Senator BARRETT. There is one question I want to ask you, and that is this: You state that there is considerable overoptimism in the country as to the real reliability of the ICBM. The question I have is this: Is there any reason to believe that Russia is ahead of us on real reliability on the ICBM?

Mr. LANPHIER. I think there is reason to believe that they are farther along in the development of the ICBM, so I would say they are closer to a point of reliability than we are by 2 or 3 years; yes, sir.

Senator BARRETT. I did not understand that there was any real information as to the reliability of their weapons.

Mr. LANPHIER. All I am going by, and Jim is more technically expert than I am, all I am going by is the fact that they have tested hundreds more of them than we have, and therefore they must be that much closer to reliability, elements of hundreds of them.

Senator BARRETT. There is one question I would like to ask Dr. Ehricke. You have been associated with Dr. Wernher von Braun heretofore, and I understand that his position is that we would make more progress by building a new space vehicle rather than using existing hardware.

What do you have to say about that?

Mr. EHRICKE. I personally cannot quite agree with this position as far as our present capabilities are concerned. We have only about 5 years', or so, time to really decisively challenge the Russians as to their superiority.

It is impossible within this time limit to develop a vehicle which does more than the existing hardware with the reliability which the existing hardware will have by then.

Senator BARRETT. What I understood your position to be is that we should use the existing hardware, and at the same time go along with building a new spaceship that would supplant it in the future?

Mr. EHRICKE. Yes. We should think about the step beyond this, but this is something that should go on, parallel. It should not replace any action that we can take now.

Senator BARRETT. Thank you very much, Mr. Chairman.

Senator STENNIS. Thank you, Senator Barrett.

Senator Symington, you have another question?

Senator SYMINGTON. Thank you, Mr. Chairman. I just had a couple of brief questions I wanted to ask that I forgot, frankly, on the first round.

Have you read the Rockefeller report, Mr. Lanphier?

Mr. LANPHIER. No, sir; only a summary of it.

Senator SYMINGTON. Do you know what it says with respect to reorganization of the Pentagon Building?

Mr. LANPHIER. Generally; yes, sir.

Senator SYMINGTON. Do you agree with that, in general?

Mr. LANPHIER. Yes, sir.

INCREASED AUTHORITY IN ONE MEMBER WOULD AID PLANNING FOR FUTURE

Senator SYMINGTON. You have had a long career in the military service, a long career in the Pentagon Building as a civilian. You have also worked in the National Security Resources Board, and you have had a long career in business since then, well, of some years.

This report gives additional authority to one person in the Joint Chiefs of Staff. Do you agree that is advisable?

Mr. LANPHIER. Yes, sir.

May I say why?

Senator SYMINGTON. I would appreciate it, and I am sure the committee would.

Mr. LANPHIER. You hear from witness after witness, starting with Dr. Bush, the first day, and right on through, General Gavin and all the rest of them, that the principal reason we are in the trouble we are, organizationally, and the principal reason we have so much delay in getting our weapons systems developed and the principal reason there is so much prodigality in buying our weapons systems, is that there is no single plan.

The reason that there is no strategic plan other than for the use of the forces in being is that no one man has the responsibility, no military man at least, technically competent military man, to engender such a plan.

Each of the Chiefs of the Joint Chiefs are responsible to their own service. The net result is, as Dr. Kissinger and others point out, each service plans to win the war by itself, and thus duplicates and triplicates what others are doing.

The only way to get the job done quickly enough, in terms of integrated, appropriate effort, is to have an integrated plan, and the only way you can get an integrated plan is to make some man responsible, finally responsible, after taking all the advice he can:

"I am the No. 1 military planning man in the Pentagon, Mr. Secretary of Defense, and I finally conclude this is the appropriate plan against the threat."

Then the Secretary of Defense says: "Fine and dandy;" asks him the question, and endorses the plan, goes to the President, and the President agrees, that is the plan, that is the integrated plan, and it is surprising how things flow therefrom.

Requirements that make sense and don't duplicate each other flow to the services. The assignments and missions make sense; you can reassign the roles and missions with the forces in being.

The only way we can work out of the trouble in the next 5 years, we have got to use the Army, Navy, and Air Force, and the Marines in the next 5 years, not invent more services. And these services, in turn, pass on out to industry following the same philosophy: this is the plan, the general approach we have got to have by this period of time, 5 years from now or 8 years from now, and they ask: "Which one can do it the cheapest and can give us the best performance?"

The industry comes in, competes, North American, Boeing. We come in on a bombing system, and say: "This is our idea," and then the system has something to work against that is integrated to a related plan.

You pick the industrial unit that is doing the better job, give them the better technical responsibility and the money, check them every 6 months, represent the taxpayers appropriately but let them do the job, and you can get the job done no quicker way in the next 3 to 5 years.

ACCORD WITH VIEW THAT TRUE UNIFICATION WOULD SAVE BILLIONS

Senator SYMINGTON. Now, one final question.

Frankly, I was amazed to see how little money is being asked for in the present supplemental request for the fiscal year 1958, and how many areas which we have had detailed testimony on are sadly lacking in funds, or have been completely disregarded in this supplemental request; and although a supplemental request doesn't mean an expenditure, nevertheless it makes it possible to initiate essential programs sooner.

As you well know, for many years Under Secretary McCone, a former businessman, and I have stated that if we had any semblance of true unification in the Pentagon Building, we could save billions of dollars a year, at no sacrifice to our national defense.

Will you agree with that?

Mr. LANPHIER. I certainly would agree with it.

I don't recall, however, what former Secretary McCone—let that be a reservation, but I would agree we could get a great deal more for the dollars—

Senator SYMINGTON. I didn't understand what you said about McCone.

Mr. LANPHIER. I agree, No. 1, with the statement we could get a lot more for the money that we are now spending, if we had a more integrated approach. I don't believe dollars, at the moment, are the final arbiter.

Senator SYMINGTON. But my point is, we say we cannot afford to put any more in the budget because of the economy, and yet there are billions of dollars annually that we could get to put into defense, if we had true unification in the Pentagon, are there not?

Mr. LANPHIER. Yes, sir.

Senator SYMINGTON. Thank you, Mr. Chairman.

Senator STENNIS. Thank you, Senator Symington.

Everyone remain seated, please. Let's have quiet.

I have an announcement here about future sessions.

These same three gentlemen will be heard further this afternoon in this chamber, at 2:30, but the session will be an executive session.

Also, this afternoon we expect to hear Mr. Collins of the Northrup Co. Mr. Collins will have, as the Chair understands, a statement for the press, but he will be heard by the committee. That statement will be inserted in the record, and then he will be heard in executive session also; so the substance of that is the Chair now understands there will be a statement for the press, but all testimony then taken this afternoon will be in executive session.

Are there any other announcements?

(No response.)

Senator STENNIS. The committee will stand in recess until 2:30.

(Whereupon, at 12:45 p. m., the subcommittee recessed, to reconvene in executive session at 2:30 p. m. the same day.)

INQUIRY INTO SATELLITE AND MISSILE PROGRAMS

FRIDAY, JANUARY 17, 1958

UNITED STATES SENATE,
PREPAREDNESS INVESTIGATING SUBCOMMITTEE,
OF THE COMMITTEE ON ARMED SERVICES,
Washington, D. C.

The subcommittee met, pursuant to recess, at 10 a. m., in the old Supreme Court chamber, United States Capitol, Senator Lyndon B. Johnson (chairman of the subcommittee) presiding.

Present: Senators Johnson of Texas presiding, Stennis, Symington, and Bridges.

Also present: Senators Jackson, Smith of Maine, Bush, and Barrett.

Edwin L. Weisl, chief counsel; Cyrus R. Vance, counsel; Gerald Siegel, associate counsel; Solis Horwitz, associate counsel; Daniel F. McGillicuddy, associate counsel; Stuart P. French, associate counsel; and Edward C. Welsh, staff adviser.

Also present: Senator Kerr, of Oklahoma, and Representative Belcher, of Oklahoma.

Senator JOHNSON. The committee will come to order.

This morning the committee is pleased to have as its first witness, Mr. Donald W. Douglas, Sr. Mr. Douglas is one of the pioneers of the aircraft manufacturing industry. He was chief engineer of the Glenn L. Martin Co., Los Angeles, before World War I and returned to that position after service as chief civilian aeronautical engineer with the Signal Corps in 1916 and 1917. He founded Douglas Aircraft Co., Santa Monica, Calif., in 1920, and presently serves as its chairman of the board and chief executive officer.

Mr. Douglas is founder and president of the Aircraft World Production Council. He has received the United States Air Force Exceptional Service Award and the French Legion of Honor.

Mr. Douglas, it is gratifying to the chairman that you should appear before our committee. We anticipate your testimony with a certainty that it will be valuable.

Would you please stand? Do your associates expect to give any testimony?

Mr. DOUGLAS, Sr. Yes.

Senator JOHNSON. Would you ask them to stand and raise your right hands and take the oath.

Do you solemnly swear that the testimony you give this committee will be the truth and the whole truth?

Mr. DOUGLAS, Sr. I do.

Mr. DOUGLAS, Jr. I do.

Mr. JOHNSON. I do.

Senator JOHNSON. Be seated, please.

Do you have a prepared statement, Mr. Douglas?

Mr. DOUGLAS, Sr. Yes, I have, Senator.

Senator JOHNSON. Would you just proceed to read it and then counsel will examine you.

(Biography of Donald W. Douglas, Sr., is as follows:)

BIOGRAPHY OF DONALD W. DOUGLAS, SR., CHAIRMAN OF THE BOARD, CHIEF EXECUTIVE OFFICER AND FOUNDER OF DOUGLAS AIRCRAFT CO., INC.

Born Brooklyn, N. Y., April 6, 1892.

Higher education: Trinity Chapel School, New York City; United States Naval Academy, Annapolis, Md.; Massachusetts Institute of Technology, bachelor of science degree.

Honors include United States Certificate of Merit, Guggenheim Medal, Collier Trophy, Commander's Cross of the Order of Orange-Nassau, Officer of French Legion of Honor, Joint Chiefs of Staff selection in 1957 for most outstanding contributor to transportation.

Highlights of career: As chief engineer for Glenn L. Martin Co., designed the first Martin bomber of World War I.

In 1920 founded his present company in California with \$600 in assets.

Built famed Cruisers which made history's first round-the-world flight in 1924.

Developed immortal DC-3 transports which revolutionized passenger air travel by establishing new standards of safety, speed, comfort, and dependability. More than 11,000 of this type transport were built.

Guided the evolution of modern passenger air travel with the DC-4, DC-6, DC-7, and now the DC-8 jetliner.

Contributed numerous aircraft to this Nation's air defense and striking power during World War II, the Korean war, and for today's Air Force and Navy inventory.

Has been engaged in the development, design, and production of missiles and rockets since 1941.

TESTIMONY OF DONALD W. DOUGLAS, SR., CHAIRMAN OF THE BOARD, DOUGLAS AIRCRAFT CO., ACCOMPANIED BY DONALD W. DOUGLAS, JR., PRESIDENT, DOUGLAS AIRCRAFT CO.; AND ROBERT LOUIS JOHNSON, ASSISTANT CHIEF MISSILES ENGINEER, DOUGLAS AIRCRAFT CO.

Mr. DOUGLAS, Sr. Thank you very much, Mr. Chairman, for the privilege of appearing before this body. For more than 40 years, which included our participation in two World Wars, I have been associated as an engineer and manufacturer, not only with aviation per se, but also in the last decade, with all types of vehicles designed for the age of modern missile warfare and defense.

If this experience, or any opinion based on it, can be of any assistance in this investigation, I shall be most grateful for the opportunity to be of service. I regard the work of this committee as timely and essential. Given the facts and necessary leadership, Congress and the American people will act promptly and energetically.

At your invitation, I have with me today my son, Donald W. Douglas, Jr., president of our company, and Mr. Robert Johnson, assistant chief missiles engineer, to assist me when necessary. Any information not immediately available here will be supplied to the committee in writing later, if desired.

As a framework for your questions, I would like to make a few opening remarks, if I may have your permission to do so.

Our company's background in commercial and military aviation is probably well-known to you. Not so well known, perhaps, is the fact that we have been engaged in the design and manufacture of various types of missiles since 1941. A booklet relating this history has been supplied to members of your committee. In the 17 years since then the men and women of Douglas have produced nearly 20,000 missiles for the defense of our Nation.

Beginning with the Roc missile in 1941, these have covered all four basic categories of air-to-surface, air-to-air, surface-to-air, and surface-to-surface.

PRODUCERS OF MANY MISSILES INCLUDING THOR

We have produced missiles for the Army, the Navy, and the Air Force. Among the best known of these are the Navy's air-to-air Sparrow, the Air Force air-to-air Genie with an atomic warhead and the Thor IRBM, and the Army's surface-to-air Nike, Ajax, and Hercules.

As with other members of the Nike family, we are presently associated with the Bell Telephone Laboratories and Western Electric in development of one of the most important of all our potential new weapons, the Nike-Zeus antimissile system.

I have touched on this very briefly merely to let you know that we do have a rather close familiarity and a great deal of valuable experience and know-how in the type of weaponry which is of such concern to you at this time.

I know you gentlemen have questioned many leaders in the armed services, in science, and in industry, and that grave fears have been expressed about the present state of our defenses. Undoubtedly there are certain shortcomings, which must be corrected, and undoubtedly much does remain to be done.

But I wish to say most unequivocally that I do not share the gloomy opinion of so many that the race for weapon supremacy has been lost forever and that we are permanently doomed to the role of a secondary power.

Speaking from experience, I believe that the armed services and industry have been doing a much better job of keeping pace with any potential enemy than the public realizes. I personally am quite optimistic about our progress in many fields of national defense and I think it is very important that we let the American people know of our true strength and imposing accomplishments.

In another crucial emergency President Roosevelt once said that "all we have to fear is fear itself." He spoke at a time when an economic depression was the enemy, but I think what he said in those trying times applies equally well today.

I am one of those who have boundless faith in the basic strength, rugged integrity, courage, and determination of the American people. Given a proper understanding of the Nation's needs, they will do their part magnificently, as they have in every other crisis we ever faced.

As one example of the progress we have made in modern weaponry—an example with which I am familiar—I would like to cite the Thor intermediate ballistic missile project. We are proud of the fact that in less than 2 years this 1,500-mile missile has been developed, production-type models have been successfully tested, and the pro-

duction line is now in operation to turn them out in the quantity desired.

COULD PRODUCE THOR IN ANY NECESSARY QUANTITY

Furthermore, production can be accelerated to almost any degree which might be necessary. In addition, the rest of the tactical system required for operation of the Thor has been designed, tested, and is being built. Currently, the Air Force is already proceeding with plans for its use.

Now I would like to turn your attention to the antimissile missile which I mentioned earlier. I think it is important for you gentlemen to know that progress already made in the shops and in the laboratories offers convincing evidence that such a weapon has been feasible for some time. All we need now is the go-ahead signal to bring it to the same status that we have brought the IRBM.

I do not think I need to dwell upon the importance of such a defensive weapon, which might well be the difference between survival or disaster for this Nation.

I think I have been sufficiently positive and optimistic in my statements up to now so that I may be permitted to direct your attention to what I consider some of the negative aspects of our situation that need prompt action and improvement.

I do not do so in any spirit of carping criticism but only in the hope that by so doing it may help solve some of the problems we face.

One of the most formidable obstacles in the way of getting things done swiftly and efficiently is the time-consuming, agonizing process of waiting for official decisions. By that I mean decisions which will stand and on which we can act. This applies not only to the start of any given project but to the various phases of it as we proceed.

Delay and indecision on the part of many in the Defense Establishment can be as damaging to us in the long run as any action by a potential aggressor.

One conspicuous example of failure to make early and firm decisions is the Zeus antimissile project. Nearly 2 years ago we felt this weapon was sufficiently feasible to warrant a go-ahead, but so far only a small fraction of the necessary funds has been made available. Even in the case of Thor, after successful test firings, we waited from August to December for an order to increase production of this much needed missile.

Senator JOHNSON. Mr. Douglas, would you pardon an interruption there?

Senator Kerr, the ranking member of the Finance Committee who has to be at a Finance Committee meeting, is very interested in your testimony. He is particularly interested in the C-132 program that you had underway which I believe was canceled some time back.

When was that canceled?

CANCELLATION OF THE C-132 PROGRAM

Mr. DOUGLAS, Sr. The C-132, yes, sir. When was that cut back? I do not recall exactly. I would imagine about a year ago. Yes, it was about a year ago.

Senator JOHNSON. Senator Kerr is present now but has to go to another committee meeting. If you will pardon a brief interruption, I would like to have him ask any questions he may have at this time.

The Chair welcomes him to our deliberations. We are delighted to have you here, Senator Kerr, and are honored by your presence, and will be glad to have you ask any questions you would like.

Senator KERR. I just wondered if in your statement, Mr. Douglas, you referred to your thoughts with reference to the necessity of the revival of that program.

Mr. DOUGLAS, Sr. Senator Kerr, we do later on refer to the air logistics situation which the C-132 was part of, and we are providing the committee with some booklets on a study of that situation which was made.

Senator KERR. Would you repeat that?

Mr. DOUGLAS, Sr. I beg your pardon?

Senator KERR. Would you repeat that last statement?

Mr. DOUGLAS, Sr. I say we are supplying the committee with some booklets on a study we made of the air logistics situation, which the cancellation of the C-132 was involved in.

Senator KERR. Well, fine. That was the question that I was particularly interested in, and I thought if you did have some testimony with reference to that, you would give it to the chairman at this time.

Mr. DOUGLAS, Sr. Yes, sir. I think we would be pleased to do so.

Senator JOHNSON. We will be very glad to have you answer that, Mr. Douglas, if you will.

Mr. DOUGLAS, Sr. Senator Kerr, I will read from the bottom of my prepared statement, and then my son, Donald Douglas, has some information with respect to it that possible you might like to have.

Once we have the necessary weapons, however, we also must have a logistics system capable of positioning and supplying them whenever and wherever needed. This is where I think a gap is developing rapidly, and where steps should be taken now to prevent it becoming more critical.

Some time ago we had prepared a presentation on the air logistics needs of today and tomorrow. These booklets are available to this committee if desired.

Proper utilization and servicing of modern weapons demands air transportation. Gentlemen, we simply do not have sufficient modern cargo aircraft to do this job, and no provision is being made to acquire them.

LACK OF PLANNING FOR MORE ADVANCED CARGO PLANES

The C-130 and the C-133 are the only modern, efficient cargo aircraft in allied inventory, and aircraft of this type are being acquired at a painfully slow rate. Nor is anything being done for planning for more advanced and still more economical cargo airplanes.

I believe that this represents a woeful lack in our defense planning.

And, Senator Kerr, if my son, Don, may point out a few salient things in this airlift booklet that we are presenting to you.

Senator KERR. I wonder, Mr. Chairman, if he might answer whether or not, in his opinion, the C-132 is the best answer that he knows or that has been developed or planned with respect to the problem you refer to in the aircraft.

Mr. DOUGLAS, Sr. Yes, the C-132 is the best thing we know at the moment which would be a most useful air transport for the movement of many of these missiles and missile systems.

Senator KERR. Would you tell the committee the difference in carrying capacity between the plane C-132 and the next largest transport now available to the Air Force?

Mr. DOUGLAS, Sr. I will ask my son, Don, to answer that.

Mr. DOUGLAS, Jr. The C-132 under normal payload conditions could carry more than twice the payload at a long range than the C-133 that is now being ordered. The C-133 presently can carry about 40,000 pounds 3,500 miles.

The latest order for 15 C-133's has a slight engine improvement which raises that payload to 50,000 pounds.

The C-132 could have carried 100,000 to 110,000 pounds payload 3,500 miles, and under wartime conditions close to 200,000 pounds, 3,500 miles. So it was more than twice as capable as the C-133, and was about a hundred knots faster.

Senator KERR. Can you tell the committee, if you know, why the project was cancelled?

Mr. DOUGLAS, Jr. There wasn't enough money.

Senator KERR. How much money had been spent on it prior to it being canceled?

Mr. DOUGLAS, Jr. About \$70 million, I think.

I would like to make one point to the committee. We have studied for about a year, sometime in the last year I made a presentation in Washington in other areas of the airlift. We have studied more data and put together what we think is a very interesting story.

I would like to give the committee copies of this. There are two very significant pages that worry us considerably. Would you like a copy of this now?

Senator JOHNSON. We would like to have one supplied to the committee staff and one to each member, if you have that.

Mr. DOUGLAS, Jr. On page 26—no, I am sorry. On page 28 of this report is what we think is a very significant bit of data which was obtained by getting it out of the American Aviation magazine. This is not secret data, but it is available to anybody.

We just took these pictures—

Senator KERR. You just want to read in Public American Aviation magazine data?

RUSSIANS HAVE PLANES IN PAYLOAD CAPACITY OF C-132

Mr. DOUGLAS, Jr. This is a compilation of data in American Aviation magazine. What it shows is a picture, payload speed and range of all of the airplanes the Russians are building, and you can notice that they are building a thing called the TU-114TP, which is in the payload capacity of the 132.

If you will kindly turn to page 30, the next page, if you will turn to page 30, sir, you will see a comparison between the Russian airplanes that are now being procured in what quantities we don't know, and the American airplanes now being procured, and you will notice that the American—America is not building a single transport of the ton-knot capability of the Russian largest airplane.

In other words, the Russians are outdoing us in a field where there seems little excuse we should not be the world leader.

That is in the cargo field. You will also notice in the passenger field there is not a single turbine-powered airplane being bought by the military to carry high priority cargo or passengers, and yet the Russians have a Tu-104, the Tu-110, and the Tu-114.

Senator KERR. The C-132 in your opinion would have been equal to anything that the Russians are building, that is now known of.

Mr. DOUGLAS, Jr. That is correct, sir.

Senator KERR. How much money did they save when they cancelled that? How much would it have cost you to have completed delivery to have begun delivery of the C-132?

Mr. DOUGLAS, Jr. That is kind of a complicated question, sir, and I just cannot remember the numbers, I can supply them to the committee but I would have to look.

My memory is not too sharp and I would not want to give you bad numbers.

Senator KERR. Thank you, Mr. Chairman.

Senator JOHNSON. Thank you, Senator Kerr, for coming and being with us. Mr. Douglas, will you resume where you left off with your statement?

Mr. DOUGLAS, Sr. Thank you, Senator.

Resuming, gentlemen, I entered into the discussion of Thor in which I said even in the case of Thor after successful test firing we waited from August to December for an order to increase production of this much-needed missile.

In discussing this weakness in matters of decisionmaking I am not suggesting that the solution lies in putting committees on top of committees and czars on top of czars.

As in any good business, the Government should give responsibility to the Department concerned and, if dissatisfied with the work of that Department, demand proper leadership.

Creating new overhead organizations will never solve the basic problem if the departmental management is not capable or is not allowed to make the proper decisions in the first place. People who have the authority must also have the courage and foresight to make the proper decisions at the right time. In other words, what we need most is more guts and less gobbledegook.

One of the reasons that Hap Arnold, who can be regarded as the father of the modern Air Force, was a great general and led us to air victory in World War II was his courage in making firm and timely decisions. Not every decision that he made was correct, of course, but the achievements of the Air Force in World War II cannot be questioned.

INTERSERVICE RIVALRY POSSIBLE SPUR TO CONSTRUCTION

It is one of the merits of our system, as contrasted to a centralized, all-powerful single authority, that an occasional mistake need not be fatal. Too often centralization of authority simply means the absolute power to commit irreparable blunders. I believe that a certain amount of rivalry between the services is healthy and constructive if it advances the state of our sciences and thus buys valuable time in the race for weapons development.

Quite a bit has been said about the efficiency of the Manhattan project in creating the atomic bomb. However, it is my understanding that the project moved simultaneously along several different lines and therefore multiplied its chances of quickly achieving its goal. This is the type of flexibility which we must maintain in this country.

While we must be careful to avoid needless duplication of effort, let us not forget that in two major wars Germany suffered humiliating defeat because too much authority was centered in individuals who remained unresponsive to divergent and progressive points of view.

Given a clear definition of roles and missions, I believe we can afford to let the individual services act with a considerable degree of independence, provided we have far-sighted courageous people at the head of each service.

I am confident that all the services possess such men.

It is heartening to me that President Eisenhower evidently intends to use the existing machinery and to make it work more efficiently.

Closely related to the problem of decisionmaking is the problem of funding and financing. I believe that once the decision has been made to proceed with a project the entire program should be funded. The practice of hand-to-mouth funding of small increments of a program makes it difficult for us to formulate our long-range plans.

This in turn makes it difficult to instill in our employees and our subcontractors a sense of confidence in the permanence of the project. In important development projects, funding uncertainties tend to destroy the incentive and enthusiasm for continuing progress.

SECURING GOVERNMENT-FURNISHED FACILITIES BURDENSOME

I think, too, the services must have a greater appreciation for the need to provide funds quickly for equipment and facilities needed in connection with the development of new weapons. It is appropriate that such specialized facilities be financed by the Government since they are completely foreign to normal military or commercial manufacturing or development activities. Contract estimates, both as to costs and schedules, are proposed on the assumption that the Government will provide such funds when they are due.

And yet, inevitably, lengthy negotiations and delays are encountered before we can acquire and build the necessary testing and production facilities. It may interest you to know that one service itself estimates that an average of 333 delays is required to process a facilities request. May I add I do not think such delays are unique to that service.

It would be helpful also if industry could be given the full scope of a particular weapons system in one contract package. This is preferable to the practice of procuring various components of a weapons system through separate offices of the service, or from different industry sources. However, I do believe the services are becoming more appreciative of the advantages of the weapons system approach. With the complexity of the weapons we are designing, I also foresee and favor a furthering of the trend toward industry installation and maintenance of weapon sites.

Another problem I would like to discuss briefly is the tedious, time-wasting emphasis on "monitoring and reporting." We estimate that increased technical manpower of 30 percent is needed to cope with these paperwork Government requirements.

This committee's files already contain our views on what we consider a great waste of scientific and engineering talent engaged in monitoring the design and production agency. Instead of serving on reviewing committees, such scientists could better be engaged in gaining new knowledge through basic research. If the contractor has not demonstrated his ability to handle design and production, he should not be entrusted with the job.

In addition to technical reports, our industry is confronted with the necessity of making many other time-consuming, costly periodic reports. While some of it undeniably is in the public interest, we believe that much of it is unnecessary and could be curtailed. We estimate that our company devotes upward of 400,000 man-hours a year in preparing such reports for a long list of Government agencies.

These problems, which I have barely touched upon, hamper our main objective, which is the arming of our Nation to repel aggression and to maintain our world leadership. Once we have the necessary weapons, however, we also must have a logistics system capable of positioning and supplying them whenever and wherever needed. This is where I think a gap is developing rapidly and where steps should be taken now to prevent it becoming more critical. Sometime ago we had prepared a presentation on the air logistic needs of today and tomorrow. These booklets are available to this committee if desired.

WE ARE BADLY OFF IN MODERN CARGO AIRCRAFT

Proper utilization and servicing of modern weapons demands air transportation. Gentlemen, we simply do not have sufficient modern cargo aircraft to do the job and no provision is being made to acquire them. The C-130 and the C-133 are the only modern, efficient cargo aircraft in our inventory, and aircraft of this type are being acquired at a painfully slow rate. Nor is anything being done about planning for more advanced and still more economical cargo planes. I believe this represents a woeful lack in our defense planning.

In summary, let me point out that all of the problems I have outlined are capable of early solution if they are attacked forthrightly and courageously. I think it is significant that they are not basically technical. It seems to me that the slowness of our decisions as compared to the faster, unilateral action of the Russians is basically caused by our different political makeups. In this country failures are aired in public, frequently exposing our military leaders involved to heavy censure. The natural fear of such consequences creates undue caution and hesitation in the development of new weapon concepts.

While I do not know the ultimate fate of those who make a Russian butch, I am sure there have been many made. We just do not hear about them. So I say again, we are in dire need of funds as required and decisions made with promptness, imagination and courage. Given this we can put to rest some of the hysteria which holds that Russia has hopelessly outstripped us in the technical field and can move again into our position of world leadership.

WE DID IT BEFORE

Let me remind you gentlemen that in 1940 we faced a challenge to our survival. President Roosevelt boldly called for the production of what seemed to many the fantastic number of 50,000 airplanes a year. It was my pleasure then to respond on behalf of the aircraft industry and to say "we can do it." And we did, and much more besides.

Once again I am confident of this Nation's ability to react courageously in time of crisis. A big job remains to be done but I have every faith that we shall do it successfully and in time.

Senator JOHNSON. Does that complete your statement, Mr. Douglas.

Mr. DOUGLAS, Sr. That does, sir.

Senator JOHNSON. Thank you very much.

Counsel, will you proceed with your examination.

Mr. WEISL. Mr. Douglas, on page 2 of your fine statement you state, after pointing out that we have examined many witnesses, that you do not share the gloomy opinion of so many that the race for weapons supremacy has been lost forever, and that we are permanently doomed to the role of a secondary power.

Mr. Douglas, not a single witness who appeared before this committee made any such gloomy prediction. What they did say was this: that the rate of progress that Russia is making is so great that unless we take extraordinary and speedy steps to meet that progress, we will become a second-rate nation and we will be outstripped technologically and militarily.

Do you agree with that?

Mr. DOUGLAS, Sr. I do agree with that.

Mr. WEISL. Do you think that we have taken sufficient steps at the present time to meet the rate of progress that Russia is making militarily and technologically?

Mr. DOUGLAS, Sr. No, I do not believe we have.

Mr. WEISL. On page 3 of your statement you very properly point out that another President said when we faced a great depression, "All we have to fear is fear itself." Do you believe that those words would have had any meaning unless they were followed by positive action?

Mr. DOUGLAS, Sr. No, they would not have had a bit of meaning then.

Mr. WEISL. We have heard many statements by many people in authority that today the Nation is in great peril, but do you think those words will have any meaning unless they are followed by positive and immediate and prompt action?

Mr. DOUGLAS, Sr. No, we certainly have things we have got to do.

Mr. WEISL. Do you believe we have taken the necessary positive and prompt action?

Mr. DOUGLAS, Sr. No, I don't.

Mr. WEISL. To meet this dire peril?

Mr. DOUGLAS, Sr. No, I don't. We have not taken enough steps.

Mr. WEISL. You very properly and proudly point to, and I am sure the committee will congratulate you on the progress that you have made in the important development of the Thor, the intermediate range missile.

Do you believe, Mr. Douglas, that the prediction as to the military combat capability of that weapon has been too optimistic?

Mr. DOUGLAS Sr. Mr. Weisl, I don't know whether I can answer that in open session or not.

Mr. WEISL. Will you be good enough to answer that in closed session?

Mr. DOUGLAS Sr. I certainly will.

INSUFFICIENT STRESS ON ANTIMISSILE MISSILE

Mr. WEISL. Thank you. Now, you called the attention of the committee to the importance of the antimissile missile program and the very important work that Douglas is ready to do in that field. Do you believe that you or the aircraft industry have been given enough authority or contracts or research and development contracts in that field to prepare that needed weapon?

Mr. DOUGLAS Sr. No. I don't think as much has been done to date as should be done.

Could I ask Mr. Johnson to speak a little more fully? Mr. Johnson is our assistant chief missiles engineer, and is well able to tell you these things.

Mr. WEISL. Will you please do so, Mr. Johnson?

Mr. JOHNSON. Yes. I think the main point is that we can see that the major technical problems involved in getting a satisfactory antimissile defense are quite soluble. As is always the case, the longer you wait, the more refined becomes your solution, but we believe we are at the point where doing something and having a perfectly capable operating weapon is entirely feasible and should be done as soon as possible.

Mr. WEISL. What have we done?

Mr. JOHNSON. We have conducted numerous studies. We have conducted numerous experiments concerned with structure, high temperature problems, aerodynamics, radar ranges, and that, of course, having been done by our partners in this venture, Bell Telephone Laboratories, and all of these experiments and all of these studies say that it is a completely feasible operation.

The main thing is that the studies and experiments and the detailed designs based upon them have not proceeded as fast as they could have based upon the state of the art, because of the funding or lack thereof that Mr. Douglas mentioned.

Mr. WEISL. Do you consider this program so important that some things must be done immediately?

Mr. JOHNSON. I would think so, yes.

Mr. WEISL. What do you suggest that we ought to do immediately?

Mr. JOHNSON. I think Mr. Douglas' statement says a go-ahead is required and it can be done.

Mr. WEISL. Have you gotten the go-ahead?

Mr. JOHNSON. Not in sufficient urgency and in sufficient amount, would you say, Mr. Douglas?

Mr. DOUGLAS Sr. Yes, that is about the situation. What Mr. Johnson is trying to say is we have minimum funds to do what you might call basic research on the potentials of the system, but we think that the potentials have been shown to be good enough from what work has been done today that if the military believed a weapon of that type

has reason for being, it should be launched into some further minimum production.

THE OLD QUESTION OF THE AVAILABILITY OF FUNDS

Mr. WEISL. But in your conferences with the military, you have gotten the opinion from them that it should be done; have you not?

Mr. DOUGLAS, Sr. That is right.

Mr. WEISL. What is holding it up?

Mr. DOUGLAS, Sr. I don't know, but I suppose it is a matter of funds available.

Mr. WEISL. You point out that it is very important to let the American people know of our true strength and our imposing accomplishments, with which I am sure the committee agrees, but don't you think it is equally important to let the Congress and the people know of our shortcomings?

Mr. DOUGLAS, Sr. I think so, and I think in that connection that we ought to tell the people what we believe we know the Russians have.

Mr. WEISL. Do you think we have told the people what we believe the Russians have?

Mr. DOUGLAS, Sr. Not authoritatively.

Mr. WEISL. Don't you think that ought to be told?

Mr. DOUGLAS, Sr. Yes, I definitely do.

Mr. WEISL. Now, in talking about the process of decisionmaking, you very properly point out, as have many witnesses, that the time-consuming effort of trying to get a decision in the Department of Defense is so great that it increases our lead time to a point where we cannot compete with Russia in the speed of making weapons.

What would you suggest be done, Mr. Douglas, to cut down that process?

TOO MANY PEOPLE WITH VETO POWER

Mr. DOUGLAS, Sr. Well, I think mainly the thing to do is to have less people concerned with it and I agree rather thoroughly with what I understood a previous witness stated, and that was that there were too many people who could make negative decisions. They could stop a project, although they did not have the power to let it go.

So the decision-making in the services in the main, as I have observed it, is delayed by so many people concerned, so many people in a position to voice their opinions, if only negative.

Mr. WEISL. In other words, too many people have the right to say no, and not enough people have the responsibility or the authority to say yes.

Mr. DOUGLAS, Sr. I think that is about it.

Mr. WEISL. Do the people who have the right to say no, have any responsibility, as a rule?

Mr. DOUGLAS, Sr. In many cases, no.

Mr. WEISL. You also point out in your statement, Mr. Douglas, that it is heartening to you that the President evidently intends to use the existing machinery to make it more efficient.

As I understand the President's statement, he pointed out that interservice rivalry must be stopped and that some reorganization must take place in the Defense Department to stop such interservice rivalry, wherever it exists, and to make the Department more efficient.

You agree with the President's recommendation in that respect, do you not also?

Mr. DOUGLAS, Sr. Yes, I do indeed.

Mr. WEISL. You point out in your fine statement, Mr. Douglas, on page 6, that it may interest the committee to know that one service estimates that an average of 333 days is required to process a facility request, and you point out that this is not unique to that service.

What do you think ought to be done to stop that kind of a delay?

Mr. DOUGLAS, Sr. Well, I think that is somewhat along the lines of what I mentioned before, there are too many people concerned in making decisions.

There are too many people in the services who have to go through a study of a facility request before it could be up to the top for approval.

Mr. WEISL. You also point out that your company devotes upward of 400,000 man-hours a year in preparing reports for a long list of Government agencies.

Do you believe that the preparation of these reports is necessary to that extent?

Mr. DOUGLAS, Sr. No, I think in the main that there is just too much of it and I think at this point, my son Don wishes to speak with respect to the facility question.

Mr. WEISL. Do you believe—

Mr. DOUGLAS, Jr. May I add an answer to my father's facility question, Mr. Weisl?

Mr. WEISL. Yes, sir.

Mr. DOUGLAS, Jr. Part of the problem on the facility question is that in this fast-moving missile age, when you have to get concrete emplacements and things like this and go through public works, that this is another line of action; and we actually built the Thor faster than the concrete was poured at Cape Canaveral to receive it.

There must be some better procedure in these test facilities for fast action, and I think it would do well for this committee to look into this point, because if we can actually design and develop, build the tooling and build the missile faster than the administrative system allows the concrete to be poured, there is something wrong.

WOULD CONTRACT DIRECTLY FOR TEST FACILITIES

Mr. WEISL. What do you believe, Mr. Douglas, should be done?

Mr. DOUGLAS, Jr. I think on these test facilities, that it is very possible that some other form of contracting, either directly with the contractor so that he could contract for these test facilities other than straight public works like big projects which have a reasonable long lead time and are not necessary on a very fast basis.

But on these test facilities we must have a fast-moving system if we are going to keep up with the speed of the weapon development.

Mr. WEISL. I think, Mr. Douglas, Jr., that it would be very important for you to point out to Senator Bridges and to Senator Bush, who were not here, the facts concerning the weakness that we have in the logistic air-transport division of our Armed Forces compared with Russia.

Mr. DOUGLAS, Jr. You mean now, Mr. Weisl?

Mr. WEISL. Sir?

Mr. DOUGLAS, Jr. You mean now, sir?

Mr. WEISL. Now, yes, sir. If you don't mind, I would like Senator Bridges to hear this.

Senator BRIDGES. O. K.

Senator JOHNSON. Would you repeat your question, Counsel?

Mr. WEISL. I would like Mr. Douglas to point out the weakness that our military forces have in the air-transport field as compared with the strengths of Russia in that field.

Mr. DOUGLAS, Jr. It is our basic concept that, in the age of missiles, large supply depots and things like this are absolutely untenable in the forward area. Certainly with the cost of our weapons going up at such a startling rate—the cost of our jet engines and our rocket engines that we cannot maintain World War II pipelines. Because of this we strongly support air logistics and feel that all of our supplies basically belong at home.

Well, to support this air logistics system takes modern, up-to-date aircraft.

On page 28 of our special study, we have tried to put together data showing our problem of encirclement versus the Russian problem of working inside out with shorter supply lines. The thing that staggered us, the Russians have, we think, an easier problem than we do; because we have to work clear around Russia and then we have to work inside out.

The Russians are building, as you see on page 28, a whole list of passenger and cargo airplanes, every one of them of turbine power, either turboprop or jet.

Now this data is gotten out of American——

Senator JOHNSON. You are referring there to chart 15?

Mr. DOUGLAS, Jr. Yes, chart 15. This data is gotten out of American magazines, there is no secrecy of the data.

We just compiled it. On page 30, chart 16, is a measure of ton-knot productivity—a ton-knot productivity is the measurement of horsepower so to speak, of airlift, what can airlift do—and this shows that the Russians have 4 modern turbine-powered cargo airplanes in being when we have two. The Russians have three turbine-powered modern passenger-carrying airplanes in the military establishment, and we have none.

RUSSIAN TRANSPORT PLANE EFFICIENT AND ECONOMICAL

Mr. WEISL. Are there any other differences that you point out in your chart that ought to be called to our attention?

Mr. DOUGLAS, Jr. Most especially, the TU-114. The TU-114 is a very large airplane which has about twice the ton-knot productivity of the C-133, and this means that it can do a lot more work at more efficient costs.

In other words, the ton-mile costs of operation should be very low, and it seems to me quite a shame when the United States leads the world in air transportation that we should lose this leadership to the Russians.

Mr. WEISL. Thank you, Mr. Douglas.

Mr. Douglas, Sr., the aircraft industry is the prime contractor on which the United States depends for missile development and production, is it not?

Mr. DOUGLAS, Sr. Not in all cases.

Mr. WEISL. In most cases?

Mr. DOUGLAS, Sr. In many cases.

Mr. WEISL. In the case of the Thor, they depend on Douglas as the prime contractor.

Mr. DOUGLAS, Sr. Yes.

Mr. WEISL. In the case of the Atlas, they depend on Convair as the prime contractor.

Mr. DOUGLAS, Sr. Right.

Mr. WEISL. In the case of the Jupiter, they depend on the Army Arsenal and Chrysler.

Mr. DOUGLAS, Sr. That is right.

Mr. WEISL. And in the case of the Titan, they depend on the Glenn L. Martin Co.

Mr. DOUGLAS, Sr. Right.

Mr. WEISL. Together with the subcontractors, and so forth.

Do you believe that with the changing art, and with the fast-changing technology, that the Government is making it possible for the aircraft industry to be strong enough to meet these changing techniques?

Mr. DOUGLAS, Sr. No, they have not. Our industry here, of course, has had an increasing financial load. Among other things, we are phasing ourselves into a new business. That imposes more financial load on us than when we were just building airplanes.

In addition to that, also, as I think all Senators know, recently our payment terms have been changed by some of the services, so we are forced to finance more than we have contemplated.

But it seems to me basically that, one way or another, the industry is not allowed to have enough fat on its bones to have the money to do the proper amount of research and research development.

Now, I think that is the most important thing, and I might show you specifically in one instance what I mean.

We got together with the Bell Laboratory people about a year before the Thor contract was placed, and we each spent considerable sums of money, I think something well over a million dollars on our own, and entirely speculatively, on what became the Thor.

That is the sort of a thing that the industry has already done a great deal of, and I think it is the sort of thing that industry should do. They should do the forward thinking, and they should have enough confidence in their ability and their forward-thinking to spend their own money on it.

We are perfectly prepared to do it if we have the money. But now, because of some of the things that have happened, because of some of the findings of a renegotiation board in the last year, our company, and I am quite sure some of the other companies, are finding that they do not have as much surplus to do that sort of thing with.

And that, I think, will represent a loss to the company—to the country, if that condition continues to exist.

THEY ARE ASKED "TO FINANCE THE GOVERNMENT"

Mr. WEISL. Mr. Douglas, you point out that in some respects the aircraft industry is financing the Government.

Mr. DOUGLAS, Sr. Well, I do not mean that as far as research is concerned. I think that its prime obligation, if we have the money and we expect to stay in business, we have got to spend money to keep our know-how up and to be in position to present things to the military that they may not even have thought of.

Mr. WEISL. What I referred to is the failure to make adequate progress payments as you lay the money out.

Mr. DOUGLAS, Sr. Yes, that is right. In effect we have been asked in recent months to finance the Government to some extent, and that, as we all know, is because of the budget situation.

Mr. WEISL. Now, when you finance the Government, you must borrow money somewhere, don't you?

Mr. DOUGLAS, Sr. That is right.

Mr. WEISL. And you must pay interest on that money?

Mr. DOUGLAS, Sr. Yes. Of course, we pay considerably more interest than the Government would pay if they were to borrow the money directly.

Mr. WEISL. So that the Government loses that differential between what the Government could borrow the money at and what you have to pay the Government?

Mr. DOUGLAS, Sr. Yes. It is not an economical way to do in the end for the Government.

Mr. WEISL. And are you allowed to charge into your costs the interest that you have to pay to finance the Government?

Mr. DOUGLAS, Sr. Not except in some specific-small cases.

Mr. WEISL. So that on the one hand you pay interest to raise money to finance development and production work for the Government, and on the other hand you are not allowed to charge as an expense the cost of that money?

Mr. DOUGLAS, Sr. By and large that is true, yes.

RENEGOTIATION BOARD DECISIONS CALLED ARBITRARY

Mr. WEISL. You referred to the process of renegotiation. Are there any rules or standards by which renegotiation is determined?

Mr. DOUGLAS, Sr. Not that we have ever been able to discover. They seem to be arbitrary decisions and we have never as yet, and I have appeared personally before the Renegotiation Board in reviewing one of our cases, I never could get any statement from them at all as to what rules or how they arrived at their decision.

Mr. WEISL. What is the result, what is the effect of that kind of a process on your business?

Mr. DOUGLAS, Sr. Well, the effect is that it is just one of the other things that is going to cause an attrition of our capital resources.

Mr. WEISL. Does that make you weaker?

Mr. DOUGLAS, Sr. That makes us weaker.

Mr. WEISL. And does that affect your ability to produce as efficiently and quickly for the Government?

Mr. DOUGLAS, Sr. It certainly will in many cases, particularly as I fear it will affect our ability to do the forward thinking and the forward spending that we have always done.

Mr. WEISL. Thank you, Mr. Douglas.

Now, Mr. Johnson, we received a letter in answer to our questionnaires concerning various recommendations that your company suggested to make more efficient our war effort. One of the questions we asked your company was this:

With respect to the missile programs, has there been an adequate and proper use of scientific manpower?

Your answer was as follows, and I quote:

My answer to this question is "No," for the following reasons:

It is my opinion that scientific manpower has been wasted in entirely too many study groups and superimposed scientific organizations for the purpose of master-minding development programs. I believe many of these peoples would be better engaged in expanding basic knowledge which is urgently needed.

Do you care to comment on that?

Mr. JOHNSON. Yes, sir. I think the root of this problem is the combination usually of the two words "research and development." Research is in itself sort of a threading about, looking for basic knowledge. It is learning. And there are certain people who, by education and bent, are well qualified to do that. You usually call them scientists.

OUT OF THEIR TRUE ELEMENT

When these people are pulled off to monitor and to try to be down the road as engineers and have a goal and not be rather widespread in their thinking, it is a waste of their talents.

Furthermore, when you then superimpose these monitoring people on top of a basic qualified organization such as ourselves, it is a waste of people who could be used elsewhere in the country to do supplementary or other projects. The monitoring is not necessary if you have a qualified organization, so you must separate, we feel, the research problem of gaining basic knowledge, of learning things, and the application of that knowledge in a development project with a single-minded goal.

Mr. WEISL. You also stated in your letter, and I quote:

It is my belief that many fine American scientists have found themselves in an untenable position when charged with the responsibility of administering weapons system developments. A scientist abhors a time schedule as much as an engineer abhors a contract for something which he has not the means of delivering.

This is precisely why, in private industry, basic and applied research is usually segregated for freedom of action in a staff capacity rather than a line capacity.

You do believe, do you not, that basic research should be segregated from applied or supporting research?

Mr. JOHNSON. That is exactly the point. It is something which by training and by the basic way in which you get knowledge has to be separately financed and not have a basic schedule attached to it, so that the man is free to follow up each little lead as it comes along.

If, on the contrary, you follow each little lead that comes along as you are trying to develop a weapon, you never get to your goal. So you should separately fund and adequately fund a basic research effort, a learning effort, so that there is a pool from which to draw to build the basic weapons system now by engineers who are headed toward a specific goal.

Mr. WEISL. You also point out as follows:

That your committee—

meaning the Johnson Preparedness Committee—

could find no more effective means for enhancing productivity of available technical personnel than by making certain that basic research is adequately administered and funded separately from hardware development.

Do you believe that?

Mr. JOHNSON. That is right, it should be kept separate.

Mr. WEISL. You then also point out, and I quote:

I believe two principal causes of chronic delays can be stated, and they are related. The greatest bottleneck of all is the lack of funding on projects critically needed by the military. This lack of funding often seems to result from an inability on the part of the Defense Department to decide whether to go ahead on the recommendation of the service. This is particularly true if there are counterproposals from other services.

Would you care to comment on that?

Mr. JOHNSON. I think this goes back to Mr. Douglas' statement on decisions and the fact that they are impeded by a nonclear statement of roles and missions. Once you have a clear statement of a technical problem and have pointed out the need for a weapons system, in general, with proper funding that can be obtained quickly with the talents available in America today, once you get the goal.

ENDORSES HIGH CAPABILITY FOR SAC

Mr. WEISL. In view of the fact, Mr. Douglas, Sr., that the ballistic missile or the intercontinental ballistic missile and the intermediate range ballistic missile is a thing of the future, you believe that our forces in being, such as SAC, should be kept at their highest strength?

Mr. DOUGLAS, Sr. I do indeed.

Mr. WEISL. Do you believe they are being kept at their highest strength?

Mr. DOUGLAS, Sr. I am no authority on that, Mr. Weisl.

Mr. WEISL. Do you believe also that we should not only concentrate on intercontinental wars, but be ready for limited or nibbling wars?

Mr. DOUGLAS, Sr. I think we certainly should.

Mr. WEISL. Your son pointed out one field, the air transport field, in which we are terribly far behind the Russians.

Are there any other fields that you want to point out in which we are behind?

Mr. DOUGLAS, Sr. Yes, I think we are somewhat behind in tactical aviation now, which is the type of aviation used in limited wars, and also antisubmarine defense.

Mr. WEISL. In what, sir?

Mr. DOUGLAS, Sr. Antisubmarine defense.

Mr. WEISL. Is there anything that I have not covered in my questions, gentlemen, that you would like to tell the committee?

Mr. DOUGLAS, Sr. I cannot think of any.

I will ask Don or I will ask Bob here if they have something they would like to add.

Mr. Johnson?

Mr. JOHNSON. I think one further thing in connection with industry handling the problem once the go-ahead is given, and that is the need as pointed out in your statement in the letter which you read from for the giving of the total system responsibility to a single organization so that the supporting elements of the weapons system can be carried along at the same time.

A missile is nowhere near the whole weapons system.

Many times it is less than that, and if improperly conceived and improperly funded so that these other elements of the system cannot be properly integrated, you arrive with a poorer quality system at a later time.

So the problem of weapons system planning and proper funding of the whole system is a real essential.

Mr. WEISL. By "the whole system" you mean, taking the Thor for example, the missile, the manpower to properly handle the missile, the base and the launching system, and so forth.

Mr. JOHNSON. That is right; all of the servicing items as well as the missile itself.

Mr. WEISL. And you do not believe they are being properly coordinated now?

Mr. JOHNSON. This is made difficult by some of the both funding techniques and some of the techniques in the services of parceling out pieces of the system.

Associated with this I think is the training problem.

Mr. DOUGLAS, Sr. Yes, sir, I was about to mention training in that respect.

Mr. WEISL. Training of crews?

Mr. DOUGLAS, Sr. Training of the ground personnel as well as the operating crews.

Mr. WEISL. Thank you, Mr. Douglas. We will have some further questions to ask in closed session. That is all I have, Mr. Chairman.

Senator JOHNSON. Thank you, Mr. Douglas.

RATE OF PRODUCTION CAN BE INCREASED

Mr. Douglas, can we get operational intermediate ballistic missiles faster than our present plans provide, and if you think we can, should we, and if we should, what must we do?

Mr. DOUGLAS, Sr. We can increase our rate of production, Senator Johnson, from what we are presently doing. There is no question of that. Whether we could have X number of operational squadrons any quicker by any crash program I am not too sure of.

Mr. DOUGLAS, Jr. I would like to add this: It would be difficult but may be slightly possible to accelerate the first squadron but I think it would be very difficult and probably impossible.

It certainly is possible to have more squadrons quicker than the present schedule in operation.

Senator JOHNSON. Mr. Douglas, do you think we should have more squadrons?

Mr. DOUGLAS, Jr. We sure do.

Senator JOHNSON. What do you think we ought to do to get them?

Mr. DOUGLAS, Sr. Order them. I don't think it is proper for us to state how many squadrons there should be, more squadrons.

Senator JOHNSON. I have not asked you to state the number. I have asked you to speak in general terms, and I understood the basis of your general statement was that you felt that it is important to let the American people know our comparative strength and what we ought to do in this field. You are a leader in this field, were in World War II and you are now and you are responsible for some very important developments.

You have had your contracts cut back here. We know that in certain fields we are not making the progress we ought to.

Now my question is do you think that we can get operational intermediate range ballistic missiles faster than present plans provide?

I want the people that read this, if there will be any that read this history, to know what you felt about it when you testified under oath. If you think we are doing as much as we can and as we should, I want you to say so.

If you do not, I want you to hit the cold water and tell us what you think.

Mr. DOUGLAS, Sr. We cannot get as I see it any earlier squadron than we are presently attempting to do. We could get more if we wanted to do it.

Senator JOHNSON. And you think we should?

Mr. DOUGLAS, Sr. That is a question I do not think I am competent to answer because the use of the IRBM, it seems to me, to depend so much on our NATO agreements and so forth that I am not any authority on that.

THEY ARE HELPED "TO DEATH" IN PENTAGON

Senator JOHNSON. What suggestions do you have to make to the committee as to how you would speed up the decisionmaking process in the Pentagon?

Mr. DOUGLAS, Sr. I think by just a real shaking up of the organizations there, sharpening up the drive to make the personnel realize that it should be streamlined, that people should act with solidarity and not so many people should be involved as are at present in decisions.

Senator JOHNSON. Do you think that the testimony before this committee that they have too many people that are just helping us to death is a reasonably accurate statement?

Mr. DOUGLAS, Sr. I think it is about right, Senator.

Senator JOHNSON. Do you have any opinion on whether the research and development responsibility for advanced weapons should be in an independent commission or in the Pentagon?

Mr. DOUGLAS, Sr. I think there should be an independent commission on pure research. When you get to applied research, I think that the using services have got to control that.

Senator JOHNSON. It is your testimony that the military airlift is inadequate in amount and in modernization?

Mr. DOUGLAS, Sr. That is right.

Senator JOHNSON. And that situation I guess is not due to any lack of ability to produce the airlift but is due instead, I think you said, to lack of funds; is that right?

Mr. DOUGLAS, Sr. That has appeared to be the case; yes, sir.

Senator JOHNSON. Why in your opinion has this important phase of mobility received such a very low priority?

Mr. DOUGLAS, Sr. I do not know that I can answer that question. But that seems to be the determination of the services, the allotment of funds.

Senator JOHNSON. You have made your views known as persuasively as you could, I assume.

Mr. DOUGLAS, Sr. I am sorry, I did not hear that.

Senator JOHNSON. Have you any estimate as to how many C-132's and C-133's the military would require if they had the funds for that purpose?

MILITARY AIRLIFT DEFICIT PRONOUNCED

Mr. DOUGLAS, Sr. We have made a number of studies for the military on that, assuming certain things, assuming certain tests they had to perform, and Don will refer to a page in this booklet which will show to some extent what we think of it.

Mr. DOUGLAS, Jr. If you will turn, gentlemen, to page 34, chart No. 18 of our presentation on airlift, it is our earnest opinion that if we are going to safeguard our military goods and keep them at home where they belong, and if we are going to reduce the costs of inventory and wastage and spoilage and obsolescence, and keep our inventory at the barest minimum, that there is a tremendous deficit in airlift today, and you can see by our bar chart, we think there are some 4 billion ton-miles deficit.

We also think in the case of limited war that the deficit is even greater on airlift, and we think that it is possible that many people do not yet understand these missiles systems to the extent of just exactly how much supplies must go along with these missiles.

I think even ourselves, we were surprised when we had a DEI, development engineering inspection, at Douglas and saw for the first time all of the equipment that went through a firing position, and when you see that you will find out that the missile is a small part of the problem when you have got all kinds of trailers for electric power, trailers for hydraulics, trailers for air conditioners, and things like that, and it is quite an impressive thing to see what the whole package is.

And if we are going to have the mobility to move a small, hard-hitting defense force, I mean relatively small in terms of manpower vis-a-vis the Russians, you simply must have this airlift for flexibility.

Also in this report—I do not want to take your time on this—there are several pages where we show specific cases of large savings that have been made by the somewhat limited Air Force airlift of today in reducing the costs in numbers of jet engines, and reduction of spare parts inventory, and we think airlift is the one thing that you can buy for defense that pays for itself.

Senator JOHNSON. Just two final questions: Do you think that the present security regulations impede your program?

AMUSES HIM THAT THEY ARE NOT TOLD INTELLIGENCE ABOUT RUSSIA

Mr. DOUGLAS, Sr. Yes, I do. Of course, it continues to amuse me to find that we are oftentimes not told by intelligence things about the Russians. It seems to me at least we ought to know what the Russians have. I do not know what we are keeping a secret from the Russians about that they have.

But we find it difficult sometimes to get from intelligence sources their information on Russian capabilities. It seems to me at least the industry ought to know that.

Senator JOHNSON. Would it comfort you any to know that we have the same difficulty that you have? [Laughter.]

Mr. DOUGLAS, Sr. I can imagine, sir.

Senator JOHNSON. I want to summarize. I am not going to mention all the points which have been made and the handicaps which have been mentioned, because they are legion, but first, let me ask you this:

What percentage of your gross business comes from the Government?

Mr. DOUGLAS, Sr. About 60 percent now, Mr. Johnson.

Senator JOHNSON. In amount, what is the volume?

Mr. DOUGLAS, Sr. It would be about a billion dollar backlog, a billion dollar sales.

Senator BUSH. How much?

Senator JOHNSON. A billion.

Mr. DOUGLAS, Sr. We have at the moment in our backlog, our military backlog is just about the same as our civil backlog.

Of course, the military backlog moves faster. We sell air transports further ahead.

Senator JOHNSON. What is your principal military work, the missile?

Mr. DOUGLAS. Missiles, the transport, and Navy fighters and light bombers.

Senator JOHNSON. We have had many witnesses sum up their recommendations, you might say, point up where improvements could be made. I want to review what some of them have said and get your reaction to them.

They mentioned these as some of their handicaps:

Too many committees, study groups; too many layers of authority; too many and too often changes in program; too little discretion allowed the industry and the military contracting officers outside Washington.

Lack of funds; overtime restrictions; delays in budget procedure; too complex and disorganized organizations within the Pentagon itself; confusion as to priorities on weapons systems.

Unwillingness to accept and to act on the facts of the Soviet military strength.

Do you concur in those generalizations?

Mr. DOUGLAS, Sr. Yes, sir, I do, Senator.

Senator JOHNSON. Have you experienced these difficulties and have you observed that each of them handicap you in your work?

Mr. DOUGLAS, Sr. Yes, I think we have at one time or another had experiences that would indicate that those things are obstructive, all of them you mentioned.

Senator JOHNSON. Do you have any other suggestion that you think would be helpful to the country, to your company, or to this committee, which you would like for us to consider in our deliberations, or you would like to bring to the attention of the people of the Nation, which would help us do our preparedness job better, quicker, cheaper?

Mr. DOUGLAS, Sr. No, sir, I haven't any further suggestions. I think that with what has been brought out before your committee, if the Congress acts, the people understand, I am sure that the military will follow along on the recommendations that come from your results.

NOT DOING ENOUGH SOON ENOUGH

Senator JOHNSON. Would it be fair to summarize your statement as saying you do not believe we are doing enough soon enough?

Mr. DOUGLAS, Sr. That is right.

Senator JOHNSON. Thank you, Mr. Douglas.

Senator BRIDGES?

Senator BRIDGES. Mr. Douglas, when you state that there is some question in your mind about the necessity for greater production of the Thor at this time, is that due, in part, to the fact that you think the early Thors will be greatly improved later, or is it for some other reason?

Mr. DOUGLAS, Sr. No, I am not talking from a technical standpoint, Senator Bridges. I merely stated that I do not have a clear picture from any source for the roles and the missions of the Thor. And, not having that, I do not know what the quantity should be.

Senator BRIDGES. Do you feel that the early squadrons of the Thor will be of relatively top quality compared with what you ultimately see in the Thor?

Mr. DOUGLAS, Sr. Well, in anything we build, certainly from time to time as we build it we make it better.

Senator BRIDGES. Yes.

Mr. DOUGLAS, Sr. But I certainly feel that we would not send any squadrons there without a practical operating missile.

Senator BRIDGES. You feel, then, that when you release service squadrons of the Thor, that it will be a top operational missile?

Mr. DOUGLAS, Sr. I certainly expect that.

Senator BRIDGES. And you differ with the testimony given before this committee as to when the first Thors will be available?

Mr. DOUGLAS, Sr. I think at the end, Senator Bridges, that that is security information and should be stated in closed session.

Senator BRIDGES. I understand, but generally speaking do you agree without naming a specific date?

Mr. DOUGLAS, Sr. All I know is what I have read in the newspapers, and I have seen some statements by General Schriever published which I agree with.

AS LONG AS 5 YEARS TO GET A DECISION

Senator BRIDGES. Yes. I see.

What has been your experience of the length of time required to obtain a decision from the Pentagon from the time the proposal was first submitted until the time at which approval was ultimately given to the proposal?

There has been one of the problems which has repeatedly recurred in the course of these hearings.

Mr. DOUGLAS, Sr. Well, that is variable, Senator Bridges. I have seen that time as long as 5 years in some cases.

I would say that in the case of the Air Force's decision on Thor, it was made with great celerity.

Senator BRIDGES. I see.

Do you think that the decision to produce both the Jupiter and the Thor is one from which this country will benefit? I will not ask you whether or not you would have made the same decision. However, do you think that going forward with the double program is something which will eventually benefit this country?

Mr. DOUGLAS, Sr. I think it has been a beneficial situation in the development stage.

Whether there is any benefit in going forward with a production program on both Thor and Jupiter would seem to me to depend on the total quantity involved.

Senator BRIDGES. I see.

That is all, Mr. Chairman.

Senator JOHNSON. Senator Jackson?

Senator JACKSON. No questions, Mr. Chairman.

Senator JOHNSON. Senator Bush?

Senator BUSH. Mr. Chairman, I would like to ask Mr. Douglas if he has had a chance to examine the so-called Rockefeller report, the Rockefeller brothers' report.

Mr. DOUGLAS, Sr. No, Senator, I have not.

Senator BUSH. You have heard discussions about the possibility of a unified command organization and placing the Chairman of the Joint Chiefs of Staff in a more important position, where he would perhaps have a deciding voice in connection with the Joint Chiefs of Staff setup.

Do you believe that we would be better off with unified military command organization in the Pentagon now, I mean immediately, than without it?

DOES NOT FAVOR UNIFIED COMMAND

Mr. DOUGLAS, Sr. My opinion is not a good one, not being a military man, but I am inclined not to believe that would be beneficial.

Senator BUSH. I have no other questions.

Senator JOHNSON. Senator Barrett?

Senator BARRETT. Mr. Chairman, I would like to ask these gentlemen their opinion as to the difference between the Thor and the Jupiter as to mobility.

Do you recognize there is any advantage in the Jupiter because it has been built on a basis where it can be moved quite readily.

Mr. DOUGLAS, Sr. I would like to have Mr. Johnson answer that, Senator.

Mr. JOHNSON. I think the way to answer that is that certainly it should be looked at in a broader sense than whether either system has mobility as such.

The important thing in any weapon is to build as much flexibility into it as you can without paying undue price, either economically or in terms of complexity, and I am not completely familiar with the Jupiter system.

I can only say that in the Thor system, and this applies of course primarily to the other elements of the weapons system than the mis-

sile, namely, the ground support equipment, that flexibility to utilize that equipment in any emplacement from a hardened target through a semipermanent site clear to mobility has been designed into the equipment.

So that one need not look at the systems on the basis of that comparison.

Senator BARRETT. You are familiar with the construction of the Redstone and the mobility that it had, are you not?

Mr. JOHNSON. Yes; we are aware of the details of that system.

Senator BARRETT. Could that be used by the Thor?

Along that line?

Mr. JOHNSON. I think the way to answer that is that whether mobility on a missile of the size of either the Redstone and then going on to the Thor or Jupiter is a feasible way of operation is up for the military to decide.

But, I think the point is that with the equipment now designed into the Thor system, that is capable of a mobile method of employment if you so desire.

Senator BARRETT. Well, thank you very much.

Thank you, Mr. Chairman.

Senator JOHNSON. Any other questions, Counsel?

Mr. WEISL. Not in open session, Mr. Chairman.

Senator JOHNSON. When do you want to go into executive session?

Mr. WEISL. I understand Senator Jackson must leave Washington and he would like to have Mr. Allen examined in open session first and then take Mr. Douglas and his associates in closed session.

Senator JOHNSON. That will be satisfactory. We agreed to accommodate Senator Jackson the other day. He needs to leave town, and he wants to hear Mr. Allen and Mr. Douglas.

We will call you later in executive session. We appreciate very much the contribution you have made and the frankness and candor with which you approached this very serious problem. We look forward with pleasure to reviewing with you in executive session the details of some of your testimony this morning. Thank you very much, Mr. Douglas.

Mr. DOUGLAS, Sr. Thank you, Senator.

Would you let us know when that closed session would come?

Senator JOHNSON. We would like to have you follow Mr. Allen. We will go into executive session after Mr. Allen of Boeing testifies.

We would normally go into executive session now but one of our members must leave town and therefore we want to accommodate him. He wants to hear Mr. Allen's testimony and examine him in connection with our bomber program so if you will just stand by until we can conclude with Mr. Allen we will have you in executive session at that time.

Thank you.

Is Mr. William Allen, of Boeing Aircraft Co., in the room?

Mr. ALLEN. Yes, sir.

Senator JOHNSON. Mr. Allen, will you please come forward.

Our next witness is Mr. William M. Allen. He is a lawyer who entered the aircraft manufacturing field in 1945. Since that year he has been president of the Boeing Airplane Co.

Mr. Allen, the chairman would like you to know that the committee appreciates your coming here to testify before us today. We look forward to hearing your testimony, which I know will be helpful to us in our assigned task.

Mr. ALLEN. Thank you, sir.

Senator JOHNSON. We are very proud of the outstanding work that you have done for your country in connection with the many airplanes that you make for us.

Our colleague, Senator Jackson, has asked that you appear early so that he may have an opportunity to develop certain testimony from you which we consider very important to this record.

Will you please stand and take the oath, as is customary. Raise your right hand. Do you solemnly swear that the testimony you give this committee will be the truth, and the whole truth?

Mr. ALLEN. I do.

(Biography of William M. Allen, president and member of the board, Boeing Airplane Co.):

He was born at Lolo, Mont., on September 1, 1900. He received a bachelor of arts degree from Montana State University in 1922 and a bachelor of laws degree from Harvard University in 1925.

He began as a lawyer with Donworth, Todd & Higgins, Seattle, Wash., in 1925, and was a member of the law firm of Holman, Sprague & Allen until 1945, when he became president of the Boeing Airplane Co.

TESTIMONY OF WILLIAM M. ALLEN, PRESIDENT, BOEING AIRPLANE CO.

Senator JOHNSON. Mr. Allen, do you have a prepared statement?

Mr. ALLEN. I have no prepared statement.

Senator JOHNSON. Counsel, do you care to examine Mr. Allen first or would you like for Senator Jackson to have that opportunity?

Mr. WEISL. Whatever suits the Senator.

Senator JACKSON. Go ahead.

Senator JOHNSON. Proceed, Counsel.

Mr. WEISL. Mr. Allen, what weapons systems are you presently developing and manufacturing for the military service?

Mr. ALLEN. We are building the B-52 long-range bomber at both Seattle and Wichita. We are building the KC-135 jet-tanker transport for the purpose of refueling, aerial refueling. We are building and have the responsibility for the Bomarc weapons system.

Mr. WEISL. What is the capacity of your Seattle and Wichita plants for the production of B-52's?

Mr. ALLEN. Well, it is in excess of what we are now producing, if that is the purport of your question.

Mr. WEISL. Excuse me, sir. Are you finished?

Mr. ALLEN. If that is what you meant, Mr. Weisl, it is in excess of what we are now producing.

THEY COULD BE PRODUCING SUBSTANTIALLY MORE B-52'S

Mr. WEISL. What are you now producing?

Mr. ALLEN. I am not sure as to whether these figures are classified or not as to rates of production and schedules on B-52's.

Mr. WEISL. My associate informs me that the amount is classified, so we will have to ask that in executive session.

Mr. ALLEN. Very good.

Mr. WEISL. You could be producing more?

Mr. ALLEN. Yes, sir.

Mr. WEISL. Substantially more?

Mr. ALLEN. Yes.

Mr. WEISL. At what point will the production of B-52's be phased out in your Seattle plant?

Mr. ALLEN. The phase-out process is now commencing. We will deliver the last B-52 from Seattle in February of 1959. The last airplane will come out of the factory, I believe, in November or December of this year.

Consequently, the phase-out process on fabrication is now commencing, now under way.

Mr. WEISL. And at the Wichita plant you are currently producing the B-52-G?

Mr. ALLEN. The B-52-G is in the process of being developed. The B-52-G first airplane will not be delivered until the fall of this year.

Mr. WEISL. And could you produce more B-52-G's at the Wichita plant than you are currently being called on to produce?

Mr. ALLEN. Well, yes. Of course, there is the buildup period in which you start at a relatively low rate and build up to the maximum rate that has been designated. Now, having built up to that rate, we could then go beyond.

Mr. WEISL. But you could go beyond the present rate if you got the orders to do so?

Mr. ALLEN. Yes, sir.

Mr. WEISL. Has the production of B-52's been cut back or stretched out?

Mr. ALLEN. Yes. It was stretched out. We were supposed to go to 20 per month.

Mr. WEISL. Now, you were to deliver 20 per month. What was that stretched out to?

THEY HAVE BEEN "STRETCHED OUT" TO 15 A MONTH

Mr. ALLEN. Fifteen per month. I mean the stretchout of course, was decided upon in the spring of 1957, and as a consequence, we adjusted later deliveries down.

Senator JOHNSON. That is a cutback, a cutback from 20 to 15?

Mr. ALLEN. The airplanes, sir, I believe, were added on to the program. It simply took us a longer time in which to deliver them.

Senator JOHNSON. It is a kind of a balloon-production proposition, like a balloon payment added on at the end of the installment note.

Mr. ALLEN. That is right. They stretched out the length of time in which we would make delivery of the total quantity.

Mr. WEISL. And is that true of the B-52-G?

Mr. ALLEN. The B-52-G is in many respects a new airplane. It has quite improved performance capabilities, particularly with respect to range. That airplane is in the process of being built. We have not yet completed the B-52-G.

The first, as I said, B-52-G will be delivered in the fall of this year.

Mr. WEISL. Could you deliver more B-52-G's in the future than you are now being called upon to deliver?

Mr. ALLEN. Yes, sir.

Mr. WEISL. Could you deliver them more speedily?

Mr. ALLEN. The buildup of the B-52-G in the Wichita plant is very rapid. It would be extremely difficult to accelerate the buildup to the maximum rate beyond what is now specified. Of course, the Seattle plant is not to build the B-52-G. Originally that was intended, but when the quantity of the G's was limited and it became apparent that we were designated to build in Seattle only 57 B-52-G's, and conscious of the severe fund limitations, we raised the point with the Air Force as to whether it would not be better, in view of the limited quantity to be built in Seattle, to combine those with the airplanes to be built in Wichita, and hence bring about a very substantial saving to the Government.

Mr. WEISL. But had the Government wanted to speed up the delivery and increase the quantity of the delivery of 52-G's you could have utilized both—

Mr. ALLEN. Yes.

Mr. WEISL (continuing). The Seattle plant and the Wichita plant and deliver these new improved planes in greater quantity?

Mr. ALLEN. That is right, sir.

Mr. WEISL. Now, suppose the Government decides to increase the delivery of 52-G's. Would you then not lose a great deal of lead time as a result of not having done it in the first place?

Mr. ALLEN. Oh, yes. If it were now determined that we were to build B-52-G's at the Seattle plant, there would be a gap in between the deliveries which we are now making and their termination and the pickup of the G if we were to do it in Seattle. We estimate that that could be done by the fall, we could commence deliveries out of there by the fall of 1959 if that were deemed desirable.

Mr. WEISL. If that was done now?

Mr. ALLEN. That is right.

Mr. WEISL. But suppose the Government decides to do it later. How much lead time would you then lose?

REORDER LEAD TIME IS SHORTER

Mr. ALLEN. Well, the lead time on the B-52 now is 17 months, but the use of that term should be understood. That means if you are in production, you must order 17 months before you get delivery, but once you terminate a line and are no longer in production, then, of course, a substantially longer time is involved. You must build up your work force, you must develop your tooling, and so forth.

Mr. WEISL. How much longer time?

Mr. ALLEN. Well, it would not be as great with us in Seattle by reason of the fact that we are in production on the article at Wichita. Hence by working back and forth and building some of the parts at Seattle, some of the parts at Wichita, we could perhaps cut that lead time down to less than 2 years.

Mr. WEISL. So that there would be added lead time, if I understand you correctly, of approximately 7 months, the difference between 17 months and 2 years; is that right?

Mr. ALLEN. That is right.

Mr. WEISL. Now do you know whether there is any provision in the new budget for increased production of the B-52's or B-52-G's?

Mr. ALLEN. I only know what I have read in the papers. I understand that there is not.

Mr. WEISL. Is there anything in the supplemental budget that has been requested?

Mr. ALLEN. I don't know, sir. I have not had access to that information.

Mr. WEISL. You also produce for the Air Force the tanker plane known as the KC-135?

Mr. ALLEN. Yes, sir.

Mr. WEISL. And where is that plane produced?

Mr. ALLEN. At what is known as our Renton plant which is on the outskirts of Seattle. It is in the Seattle area.

Mr. WEISL. And are you utilizing the production facilities of that plant to its full capacity?

Mr. ALLEN. Approximately so at the present time. We can go above the maximum rate per month if that is desired. We ourselves have added substantial facilities to the Renton facility so as to be able to do that.

KC-135 PRODUCTION SLOWED SOMEWHAT BY LACK OF FUNDS

Mr. WEISL. Has there been a stretchout or cutback in the production and delivery of the KC-135?

Mr. ALLEN. There has been some stretchout, not a great stretchout, but that is primarily due to fund limitations and a matter of overtime.

Mr. WEISL. You could, however, produce more KC-135's if the Air Force gave you the order to do so?

Mr. ALLEN. Yes, sir.

Mr. WEISL. In connection with a B-52-G or B-52 or the KC-135, is there anything else you would like to tell the committee that I have not covered by my questions?

Mr. ALLEN. I don't believe so, sir. I think my business is to tell you what we can do if we are asked to do it, and I question whether I should engage in speculation as to whether the country needs the articles or not.

I think that is for other sources to decide.

Mr. WEISL. Yes, I understand. What could you do if the Defense Department asked you to do it?

Mr. ALLEN. Well, as I say, we can increase substantially our production of those two articles.

Mr. WEISL. Will you describe the Bomarc which you are developing for the Air Force?

Mr. ALLEN. Yes, sir. The Bomarc is a ground-to-air defense missile.

We have been working on the Bomarc program for 7 or 8 years.

Prior to that time we had what was known as the GAPA missile which was a shorter range missile but similar to the Bomarc, so in effect, we have been working on this type of system since the end of the last war.

The Bomarc missile is now in production.

Mr. WEISL. You have been working on the Bomarc missile for 8 years?

Mr. ALLEN. Yes, sir.

Mr. WEISL. When will the first Bomarc be delivered for operational use?

Mr. ALLEN. I would guess that is classified.

Mr. WEISL. Could you be doing more?

Mr. ALLEN. Yes, sir.

Mr. WEISL. Why haven't you done it faster?

Mr. ALLEN. It is a matter of emphasis and urgency.

Mr. WEISL. And do you believe the emphasis and urgency has been adequate to meet the danger that we face?

Mr. ALLEN. Well, again I am not a military man.

I am just a citizen in that regard, but I would say that I feel it has not.

Mr. WEISL. Do you believe in view of your experience in the production of airplanes, both military and civilian, and in the development and production of missiles, that we are too optimistic in predicting when intercontinental and intermediate range missiles will be combat ready?

IT IS ALWAYS PRODUCED LATER THAN EXPECTED

Mr. ALLEN. Well, sir, I am not well informed on the ballistic-missile program. I would simply have to answer that based on the experience I have had in 32 years with the aircraft industry.

It has always been my experience that we never get a weapon operational so that we can fight with it as fast as we think we will, and just as a general proposition I would strongly urge that we keep ourselves prepared with those weapons that we know are operational and with which we can defend ourselves until they have been supplanted by something that is better and likewise is operational.

Mr. WEISL. In other words, you don't believe we ought to weaken our forces in being in the hope that we will have something better at some date in the future, until we get those things and are sure that we have them?

Mr. ALLEN. We must be sure that we have something that is better and that is operational and in sufficient quantity.

Mr. WEISL. Mr. Allen, the aircraft industry is the principal developer and supplier of missiles.

Do you believe that the aircraft industry is strong enough, under the present Government regulations and procedures to meet that responsibility properly?

Mr. ALLEN. No, sir.

Mr. WEISL. Will you please tell the committee why?

Mr. ALLEN. Well, I feel we are faced with a fundamental problem. You are really examining into a very fundamental question, this committee is, as I understand it.

As I analyze it, it all comes down to a matter of emphasis, hard work, and effort.

Our Nation is a peace-loving nation. We don't like to engage in military activities. I am glad we are that way but nevertheless it is at the root of our problem today.

This Nation has only put real emphasis on the matters of military preparedness when we were, you might say, at war.

Then, having been faced with attack, the whole Nation puts its shoulder to the wheel, and in the last two wars we have fortunately

had the time to do that and the productive genius of America has been given a chance to operate, and we have literally snowed under the enemy by our production efforts.

WE WOULD HAVE TO RELY ON POWER IN BEING

I think we all recognize that that will not be the case if we have a future conflict. To rely on our ability to produce after the gong has sounded is as obsolete as the Maginot line.

The next war, if we have such a thing, will, of necessity, be fought with the weapons that are produced in a peacetime economy in which the defense effort is, you might say, competing with our commercial effort for people and capital.

Now, in that competition, in my view, the defense industry consistently has come off second best, in its competition for the right sort of people, and for the wherewithal to do the job.

It is a lack of emphasis. The military is a good example of that. Why do we have, what is the purpose of the Cordiner bill? It is an effort to recognize that capable people are needed in the military in order to operate our weapons.

To the same degree, that is true in the defense industry. The defense industry has not been permitted to develop the strength that is required in order to meet our responsibilities.

I could go into quite a little detail on that subject—

Mr. WEISL. Go right ahead, Mr. Allen, if the chairman does not mind.

Senator JOHNSON. Well, go ahead. Your time has expired under the rules we adopted yesterday. But you go ahead, Mr. Allen.

Mr. ALLEN. Some of the examples of this were alluded to by Mr. Douglas. Let me cite a few.

In connection with the matter of progress payments, it should be understood that the progress payment is a reimbursement by the Government for money that the contractor has already spent in behalf of the Government.

It is not an advance payment.

It used to be that under our fixed-price contracts, contractors were reimbursed to the extent of 95 percent of each dollar they spent. On cost contracts, or what we call CPFF contracts, 100 percent.

On fixed-price contracts the 95 percent was reduced to 90 percent, then to 75 percent, and lately to 70 percent.

By the same token, a CPFF contract 100-percent reimbursement has been cut down to 80 percent.

So the industry, although it is really not sufficiently financed to do the job, is now being called upon to finance the United States Government. And we simply don't have the wherewithal to do it.

In other words, rather than putting us in a position to do the best job that we possibly could, we are being restricted.

Some reference was made to this matter of renegotiation.

I make the categorical statement that the Renegotiation Act, as it is now being administered, destroys incentive and puts a premium on the inefficient. It destroys incentive in our companies. I could quickly show you, give you an example of that.

We have primarily operated the Boeing Co. under what we call incentive contracts.

Take the years 1952, 1953, and 1954, all of which have either been passed upon by the Renegotiation Board or are in the process of being.

During those years we delivered B-47's and the KC-97 tanker in substantial quantities and we had had enough experience with our costs so we were able to sit down with the Government and come to an agreement on how the costs curve should go down as we went forward.

We arrived at a target price and then the contract provided if we bettered that target price, the Government would get 80 percent of the saving and the company would get 20 percent.

THE GOVERNMENT BENEFITED

During the year 1952 we beat our targets at great savings to the Government. The same in 1953 and the same in 1954.

The Renegotiation Board has now come along and in effect taken away those earnings that we made incentivewise by virtue of beating our targets.

I know of no better way to kill incentive than to do that.

Senator JOHNSON. Did you not anticipate that when you entered into an agreement with the Government?

Mr. ALLEN. No, sir.

Senator JOHNSON. You did not anticipate that?

Mr. ALLEN. No, sir. Of course, what that is, it is second-guessing the Defense Department. They negotiated a contract which they believed to be fair and equitable and took into account all these factors.

In summary, in those 3 years by beating our targets we saved the Government over \$100 million. Our share of that saving after taxes was \$9,430,000.

The Renegotiation Board for those 3 years, if they sustain in 1954 the position that has been taken to this point, there is a hearing on this on Thursday—will take away \$9,700,000 slightly in excess of our incentive earnings.

Now when we get an incentive contract we go to our supervisors, and we say we have this contract, this is the target. Here is an opportunity to save the Government money and to make some for ourselves in additional earnings.

Senator JOHNSON. Could you give me that other figure?

How much incentive then will you get after they take away that \$9 million?

Mr. ALLEN. The incentive will be gone, sir.

Senator JOHNSON. I thought it was \$9.4 million after taxes.

Mr. ALLEN. Yes, sir. That would be our incentive earning for those 3 years after taxes, \$9.4 million, and they are taking away \$9.7 million. A little in excess of what we—what the incentive is.

We say to our supervision, "Here is an opportunity to save the Government a lot of money and make ourselves some."

We have an incentive plan in our company which is shared in by all supervisors. This last year 8,000 supervisors shared in it.

Now, when I say that now to my people, and I have had this experience, I have had a foreman raise his hand and say, "But having done this what about those boys that second-guess us."

CRITICISM OF ADMINISTRATION OF RENEGOTIATION ACT

There is not any answer to that. That is an example of how to kill incentive in industry and in defense industry.

The Renegotiation Act is not being administered in accordance with its intention. No one, certainly I do not, want to earn earnings beyond what are reasonable and proper.

But this matter of incentive is all important, and I only cite it as an example. We must have it. We must have that incentive. We must preserve competition. That is the American way.

And it is not being done.

Proprietary rights are being taken away. In other words, the emphasis that is needed to do the job that confronts us is not there.

Contrast that, of course, with our potential enemy, and there the incentives are all in the other direction.

Incentives are pointed to the individual, who devotes himself to preparing Russia for war. I submit that in this country the incentives are in the other direction, and that is what is badly needed. It is a fundamental thing.

I feel strongly that we have the capability of meeting this threat, but we can only do it if we give it the emphasis and the effort that it deserves.

Senator JOHNSON. It is a very excellent statement.

I should be very happy if you would prepare a memorandum going into some detail on how you think the Renegotiation Act is failing to be administered as it should be and suggesting any amendments or improvements that you would care to for the consideration of this committee.

Mr. ALLEN. I have already done that to the Congress, sir.

Coming out of the Hébert committee hearings, Congressman Hébert asked me for suggestions which I submitted, and I would be very happy if that would serve the purpose to give you a copy of that.

Senator JOHNSON. If the material submitted to him encompasses all the views you have on that subject, that would be fine. Just make available a copy to us.

Mr. ALLEN. I shall do so, sir.

(The material referred to is as follows:)

MARCH 19, 1956.

HON. F. EDWARD HÉBERT, *Chairman,*

*Subcommittee for Special Investigations Committee on Armed Services,
United States House of Representatives, Washington 25, D. C.*

DEAR MR. CONGRESSMAN: You will recall that at the time of the appearance of the Boeing Airplane Company before your Subcommittee, I was invited to submit to your Subcommittee a proposed statement of policy for consideration by the Congress of the United States pertaining to the relationship of the Aircraft Industry with the United States Government. Attached hereto are two proposed statements of policy which I shall refer to later in this letter. First, however, I shall set forth some of the thoughts which underlie the proposed statements.

It is my understanding that your inquiry in its broader aspects is directed to the question of whether the Government, in the purchase of its aircraft, is getting as much as it should, both quantitatively and qualitatively, for each dollar spent. A consideration of this question involves the fundamentals of our free enterprise system. I made the statement before your committee that you should consider not only whether the aircraft companies' earnings are too high, but also whether they are adequate in light of the responsibilities involved. I will elaborate upon this statement.

We are presently engaged in a technological battle with Russia—bloodless but nonetheless grim. Our military leaders uniformly are expressing grave concern as to whether we are “losing the battle of the laboratories.” To give you some idea of the effort Russia is putting into the development of scientific talent, I refer you to the March 5, 1956, issue of Life Magazine and the lead article, with accompanying pictures, entitled, “The Golden Youth of Communism.” I have investigated the source of this information and I believe it to be reliable. There is no question in my mind that Russia is making a tremendous effort to develop a great body of scientists with the objective of utilizing their efforts not only economically but militarily as well.

In the aircraft field in our country, scientific development leading to more effective military weapons is largely dependent upon the efforts of privately-owned companies such as Boeing. The scarcity of scientific personnel in this country is well known, and the competition for engineering graduates is very keen. In the contest for more and better engineering personnel, the aircraft industry is in competition with our largest industrial concerns who are primarily engaged in the production of commercial commodities. This is true not only with respect to engineers but is also applicable to our entire supervisory organization, the excellence of which is determinative of the degree of efficiency of our operation. Now I ask this simple question—which type of concern offers the greatest opportunity:

(a) the company which does business primarily with the United States Government and hence operates on a low-profit basis, with such earnings as it makes subject to recapture under the Renegotiation Act, or

(b) the company primarily engaged in commercial work with no limitation on its earnings other than those which arise from competition?

To ask the question is to answer it. The aircraft companies often come off second best in the competition with chemical companies, the automobile companies, the large equipment manufacturers, et cetera, for the best available brains, both technical and otherwise.

It must also be recognized that although there has been a higher degree of stability in the aircraft industry in recent years, it is still regarded as being subject to drastic peaks and valleys. This is not an attractive feature to the employee desiring security—and with nearly all employees security is a most important consideration.

Furthermore, the facilities required to develop and produce the aircraft of today and in the future are costly and, by reason of rapid changes in the art, are subject to a high degree of obsolescence.

To summarize:

1. Russia is making a tremendous effort to achieve technical superiority, and our military leaders believe that the Russians have substantially cut into the technical lead that we have had in some fields and have passed us in others.

2. It is imperative to our national security that we regain in all essential fields the qualitative superiority that we once enjoyed and that we retain this superiority.

3. If this objective is to be achieved, those companies upon which our country relies for military weapons must have the opportunity to compete on equal terms with commercial companies for the brains (technical and otherwise) upon which the achievement of qualitative superiority depends.

4. In order to so compete, companies such as Boeing must have the opportunity for growth and development comparable to the opportunity existent in industry generally. This opportunity can only be afforded by comparable earnings.

You will observe that one proposed statement of policy affirms the rate of profit as provided in the Vinson Act. However, you may prefer to link the rate of profit on Government work to the going rate on non-Government work of a comparable character. Consequently, an alternate statement is enclosed.

If, in your consideration of this important question, the Boeing Company can be of any assistance to you, please do not hesitate to call upon me.

Respectfully yours,

Enc.

WILLIAM M. ALLEN.

Whereas, in the interest of national security, it is imperative that qualitative, as well as quantitative, superiority be preserved in the design, development, and manufacture of aircraft for the Government, piloted or pilotless, including parts and equipment therefor; and

Whereas, such design, development, and manufacture is largely carried on in our country by privately owned companies working closely with our Defense Establishment; and

Whereas, it is essential to the maintenance of qualitative superiority of aircraft that the design, development, and manufacture thereof be performed in a competitive industry by companies with organizations possessing to the highest degree technical skill and manufacturing know-how, together with the required research and manufacturing facilities;

Whereas, the development and maintenance of organizations possessing the highest degree of technical skill and manufacturing know-how and the necessary research and manufacturing facilities can only be accomplished if the companies engaged in the design, development, and manufacture of aircraft are allowed fair and reasonable earnings: Now, Therefore, be it

Resolved, That a rate of profit of 12 percent (12%) of sales price (as set forth in the Vinson Act) shall be considered fair and reasonable under contracts for the design, development, and manufacture of aircraft: *Provided*:

1. The contractor performs efficiently as demonstrated in the performance of other Government contracts.

2. The contractor has the degree of technical skill and manufacturing know-how required to perform the contract.

3. The contractor has supplied a proportion of the facilities required to perform the work which is commensurate with its financial ability to do so.

4. The contractor has retained a substantial percentage of its earnings for use in its business.

5. The contractor has made a substantial contribution to the defense effort by designing and developing outstanding products.

Whereas, in the interest of national security, it is imperative that qualitative, as well as quantitative, superiority be preserved in the design, development, and manufacture of aircraft for the Government, piloted or pilotless, including parts and equipment therefor; and

Whereas, such design, development, and manufacture is largely carried on in our country by privately owned companies working closely with our Defense Establishment; and

Whereas it is essential to the maintenance of qualitative superiority of aircraft that the design, development, and manufacture thereof be performed in a competitive industry by companies with organizations possessing to the highest degree technical skill and manufacturing know-how, together with the required research and manufacturing facilities; and

Whereas the development and maintenance of organizations possessing the highest degree of technical skill and manufacturing know-how and the necessary research and manufacturing facilities can only be accomplished if the companies engaged in the design, development, and manufacture of aircraft are allowed fair and reasonable earnings: Now Therefore, be it

Resolved, That it is the policy of the United States Government that the rates of profit on sales under contracts for the design, development, and manufacture of aircraft be generally commensurate with the going rates of profit on non-Government work of a character most closely resembling the particular work under consideration

Resolved further, That in fixing the rate of profit the Government agencies involved will take into account all relevant factors including:

(a) Efficiency of the contractor as demonstrated in the performance of other Government contracts.

(b) The degree of technical skill and manufacturing know-how required to perform the contract.

(c) The facilities required to perform the contract, both contractor owned and Government owned.

(d) The degree to which contractor has retained earnings and the utilization of such earnings.

(e) The contribution of the contractor to the defense effort in the design and development of products.

Resolved further, That this resolution is not intended to affect the limitation on profits as provided in the Vinson Act.

Senator JOHNSON. I am very impressed with your statement, and I want to ask one question and then yield to Senator Jackson if it is agreeable to my colleagues so he may conduct his examination.

Is it impractical, unrealistic, and impossible in your opinion for the Government to have competitive bids in connection with the purchase of airplanes such as the B-52, the B-58, and others?

COMPETITION ALL RIGHT AT DESIGN STAGE

Mr. ALLEN. The competition should be prior to, you might say, the purchase of the article. The competition should be in the design and the weapons concept. That is highly necessary. I mean we must preserve as high a degree of competition within the industry as it is practicable to do so.

But having reached that point, it would then seem not feasible to compete with respect to an article that someone has had no part in designing. In other words, he would not be in position to compete. The competition has to take place before that.

Senator JOHNSON. So you would say it is impractical?

You don't think you can get plans and specifications and say to the airplane manufacturers, here is the type of bomber we want; we want a hundred of these; we want them delivered over this period of time; you give us your lowest bid.

Mr. ALLEN. No one else could compete there because they would not have the background and they would not have the work that had been done up to that point.

Actually I would question whether that is where—that is not where the competition should be. I can speak very feelingly of this because we just lost a very important competition. But that was in the design stage, in the concept.

Senator JOHNSON. Senator Jackson, without objection, we will defer questions of the other committee members.

Will you proceed, Senator Jackson?

Senator JACKSON. Mr. Allen, in addition to the B-52 and the tanker, the KC-135, it is my understanding that Boeing during World War II provided the B-17, the B-29—

Mr. ALLEN. Yes, sir.

Senator JACKSON (continuing). The then heavy long-range bombers.

Mr. ALLEN. Yes, sir.

Senator JACKSON. And subsequently the B-50.

Mr. ALLEN. Yes, sir.

Senator JACKSON. And then in the jet field, it provided the B-47 and the B-52.

Mr. ALLEN. Right.

Senator JACKSON. So that your company has had substantial experience in providing for the heavy bombardment forces required by the Air Force; is that correct?

Mr. ALLEN. Yes, sir.

SEATTLE PLANT AVAILABLE FOR STEPPING UP B-52-G PRODUCTION

Senator JACKSON. And with reference to the B-52-G, which I understand is in the process of production at Wichita, would it not be possible to step up production by producing that weapons system at the Seattle plant if additional tooling were arranged?

Mr. ALLEN. Oh, yes; the plant is available for that purpose.

Senator JACKSON. At the present time, as I understand it, due to the orderly procedure that you must follow, you are now phasing out your regular B-52 production at the Seattle plant?

Mr. ALLEN. That is correct.

Senator JACKSON. The last one will be accepted in February a year hence?

Mr. ALLEN. That is right.

Senator JACKSON. Sometime ago was it not agreed that the Boeing people were to produce 20 B-52's per month?

Mr. ALLEN. Yes, sir.

Senator JACKSON. I want to assure you that what I have been referring to is all unclassified—it is in public hearings.

Mr. ALLEN. Yes, that is correct, Senator.

Senator JACKSON. And as a matter of fact, I have before me the question asked by Mr. Hamilton and answered by Mr. Wilson on page 1678 of the public hearings on airpower that Boeing, with second and third shifts, could produce 45 B-52's a month. Is that substantially correct?

I believe it was in connection with a telegram which had been sent to you to get your opinion.

Mr. ALLEN. If that is what was said, that is correct, because I know that it is in that neighborhood, yes.

Senator JACKSON. The question is:

Mr. HAMILTON. In that connection, with the latter part of the telegram—he is referring to the telegram they sent you—

Mr. Secretary, is it not a fact that as far as plant facilities are concerned and the plans now available, approximately 45 planes per month could be produced—referring to B-52's.

Secretary WILSON. They could with some additional expenditures for tools by putting on full second and third shifts.

Mr. ALLEN. Yes.

Senator JACKSON. And at the present time you are producing and will be producing less than the 20 per month which was publicly announced?

Mr. ALLEN. Yes, sir.

Senator JACKSON. The total number of aircraft of B-52's that were ordered amounts to 11 wings approximately, with the extras?

Mr. ALLEN. They changed the content of the wing. I can give it to you in figures.

Senator JACKSON. From 30 to 45 planes per wing, and is it 603?

Mr. ALLEN. Right.

Senator JACKSON. Total B-52's?

Mr. ALLEN. Right, yes, sir.

Senator JACKSON. The 11 wings would bring it up to 495 with the extras; is that correct?

Mr. ALLEN. Yes.

Senator JACKSON. And at the present time you have already testified, I take it, that that capacity could be substantially increased, particularly with reference to what is almost a new weapons system, the B-52-G?

Mr. ALLEN. That is correct.

B-52-G SUBSTANTIALLY IMPROVED PLANE

Senator JACKSON. Mr. Chairman, I want to say that there are some matters in connection with the B-52-G that should be asked in closed session. There are some features that I think are quite unique that the committee should inquire into, and I think Mr. Allen could give that information in closed session, or the Air Force could supply that information. But it is fair to say that there has been a substantial improvement in our air atomic retaliatory capability in connection with the B-52-G, is that correct?

Mr. ALLEN. Very substantial.

Senator JACKSON. Very substantial?

Mr. ALLEN. Yes, sir.

Senator JACKSON. Now, on the KC-135 it has been the policy of the Air Force to have 2 tankers, 2 KC-135's for each 3 B-52's?

Mr. ALLEN. That is correct.

Senator JACKSON. There have been some—I think General LeMay has indicated when he was Chief of Staff of the Strategic Air Command, and I believe it is his present position that there should be one tanker for each B-52.

Mr. ALLEN. Yes.

Senator JACKSON. To give greater mobility and greater security in the event of enemy hostilities; is that correct?

Mr. ALLEN. It is my understanding that the general does feel that way; yes.

Senator JACKSON. I think that is all, Mr. Chairman. I want to compliment Mr. Allen on a very fine statement. I think it is quite clear that the Boeing Airplane Co. has capacity to provide an enormous number of additional advanced B-52-G's, should that decision be made.

I would also like to comment that on the basis of the testimony to date, I do not know of any new weapons system that has been tried out that will be able to supplant or even substantially supplement on a tried and true basis, for several years to come, both the B-52 and the B-52-G.

Senator JOHNSON. What you have said is that it is not due to any lack of facilities or production ability or know-how. It is purely a question of policy decision and money to supplement that decision.

Mr. ALLEN. That is correct, sir.

Senator JOHNSON. Senator Bush.

Senator BUSH. I think, Mr. Chairman, this witness has certainly given us some new angles on problems that we had not gotten into quite thoroughly before this morning, particularly the question that he raised with the Renegotiation Board and the general question of incentives.

It seems to me all of this testimony, including that which we heard before, Mr. Allen's testimony and others, reveals the fact that there seems to be a shrinking on our part as a people or a Government from providing the necessary funds to meet the imminent threat, which I think this committee has become very much more aware of in recent weeks than we would have dared think back in November before we started.

You appreciate that if we followed the course that is strongly suggested, that this would involve very great additional expendi-

tures of money by the Government over and above what we are now budgeting for defense, do you not, sir?

Mr. ALLEN. Yes, sir; although my remarks were not primarily directed to the matter of dollars, but rather to the matter of how we do the job.

Senator BUSH. In answering the questions that were asked of you about your ability to step up production——

Mr. ALLEN. Oh, yes.

Senator BUSH (continuing). And so forth and so on—it seemed pretty clear that if production was stepped up and increased schedules were ordered and authorized, it is going to very substantially increase our expenditures.

Mr. ALLEN. That is right. I thought you were alluding to a different part of my remarks. Yes, of course, that would involve dollars.

IT WOULD MEAN INCREASE IN TAXES

Senator BUSH. What I ask you is this. Assuming that this will involve very heavily increased expenditures, do you believe that we are going to have to increase taxes to meet this increased expenditure program?

Mr. ALLEN. I would say "Yes." I think it is time that the American people recognized the situation that we are in. I view it as a very critical one, and I count our security first, and I think that it is up to us to do whatever is necessary to preserve it.

Senator BUSH. The raising of taxes is always a very ugly thought. I think one of the problems we have got to face in the Congress and with our people that we represent is the fact that it is an ugly thought and there is a great tendency to shrink from it, shrink from talking about it.

We are acquiring testimony here that points up a frighteningly dangerous threat and a substantially increased effort and expenditure to meet that threat, and I am glad to hear you say that you think it is serious enough that we will have to consider the question of increasing taxes, because I think it is quite clear that if we are going to take the additional steps that are strongly indicated as necessary by these hearings, that expenditures are going to be so much greatly increased that present revenues certainly are not enough to cover the increased expenditure.

Do you agree with that?

Mr. ALLEN. I do. You cannot have your cake and eat it too.

Senator BUSH. That is the point.

Mr. ALLEN. That is right.

Senator BUSH. You cannot do it. Would you also agree with me on this point: that while one might, in determining what the necessary additional expenditures may be, be sure that we did not have the money, in other words, we might run in the red for a limited period of time without necessarily ruining the Nation or substantially increasing inflationary forces, but also if that were not checked as soon as we knew what the bill was and the revenue was provided, that inflationary forces incident to deficit financing might be so dangerous as to greatly increase again the total cost of acquiring the increased protection?

Mr. ALLEN. I agree.

Senator BUSH. I thank you, sir.

Senator JOHNSON. Senator Stennis.

Senator STENNIS. Thank you, Mr. Chairman.

Mr. Allen, many witnesses here have talked of the need for additional billions of dollars, but you are the first one that I can recall, even though I have raised the point several times myself—you are the first one that I can recall that has come out and said yes, we should meet that situation with a tax increase, that you would be for it when it is proven to be necessary, and I commend you very highly for that.

I think the American people have got to be told both sides of this picture as we go along.

Mr. ALLEN. Yes, sir.

Senator STENNIS. What you want is a real awakening and determination of these needs, whatever they be, and then along with that, of course, a saving of whatever can be saved in other places. Then vote whatever is necessary to raise the funds, including a tax increase, if that is necessary; is that a fair summary of what you say?

Mr. ALLEN. Right, sir. We should not spend \$1 for defense that can be avoided.

Senator STENNIS. Yes.

Mr. ALLEN. But we must be secure.

Senator STENNIS. As I say, I want to commend you.

I commend Senator Bush for his statement, too, because others in places of responsibility, so far as I have read, have just spoken in terms of need and meeting it with deficit financing, if necessary, but it is certainly a part of this problem that is, is to come out with all of the picture as I see it. If these needs are going to be met with these billions of dollars, I seriously doubt that that many billions can be saved elsewhere, and I think it is inviting further trouble to even think of trying to have deficit financing to meet these ends which will lead to more inflation, more inflating of the dollar and running down of the purchasing power of the dollar, which would tend to destroy our economic system, our existing economic system.

Mr. ALLEN. Yes, sir.

Senator STENNIS. It is already under a strain. I think that is one of the big questions, and it is being overlooked largely.

I am very grateful, indeed, to have your clear thinking on that subject, your very apt statement of it and the other problems that you are particularly versed in has been very helpful to me.

Thank you.

Mr. ALLEN. Thank you very much, Senator.

Senator JOHNSON. Have you concluded, Senator Stennis?

Senator STENNIS. That is all.

Senator JOHNSON. Senator Barrett.

Senator BARRETT. Mr. Allen, as I take it, you believe that your Seattle plant should be tooled up to produce the B-52-G's rather than to extend the production of B-52's?

Mr. ALLEN. No, sir; I did not say that. That is a matter for the Government to determine as to the urgency of getting these airplanes within a certain period of time. Obviously, if the security of the

country will permit the G's to be delivered as scheduled and additional quantities to be provided through the Wichita plant, that would be cheaper than to tool up the Seattle plant at this time. That should only be done if security demands it.

Senator BARRETT. I see. Did you state that it would take about 7 months or 17, I am not quite certain, to convert your Seattle plant over from B-52's to B-52-G's?

DELIVERIES FROM SEATTLE PLANT COULD BE MADE IN FALL OF 1959

Mr. ALLEN. Our people estimated before I left Seattle that if it were decided that the Seattle plant should produce B-52-G's, that through the proper coordination with the effort that is going on in our Wichita plant, and strong efforts on our own, that we could commence deliveries of B-52-G's out of the Seattle plant in the fall of 1959.

Senator BARRETT. One other question I would like to ask, Mr. Allen. You stated that there has been a reduction in the progress payments, which payments merely reimburse you for money which you have already put out.

Mr. ALLEN. That is correct.

Senator BARRETT. From 95 percent down to 90 to 85 and, now down to 70.

Mr. ALLEN. That is on fixed-price contracts to 70; yes, sir.

Senator BARRETT. The question I have is this: How much lower can these progress payments be reduced and still permit you to stay in business by getting the money from the banks to operate?

Mr. ALLEN. I only speak for the Boeing Co., but it looks like we have reached that breaking point right now.

Senator BARRETT. It certainly seems that the Government ought not to ask Boeing to finance its operations. Is that what it amounts to? Isn't the Government calling on you to be their banker in this field?

Mr. ALLEN. That the Government is calling on us? Well, that is money we have already spent.

Senator BARRETT. That is right. I say, in effect you are called upon to finance the Government.

Mr. ALLEN. That is right, and it is uneconomic, because that money that we borrow costs us 5.93 percent, I think it is, when you allow for the balances that you must carry and the fact that your notes are discounted. Certainly, the Government can borrow money at less than that, even though we pay the——

Senator BARRETT. I am just a country boy. I would like to understand this financial operation you are speaking of. Does the Government pay you interest on this money that you put out?

Mr. ALLEN. No, with one exception. In the case of the cost contracts, cost-plus-fixed-fee contracts, where the reimbursement used to be 100 percent and is now reduced to 80, they have asked us to amend our contracts so as to reduce that to 80, even though the contract provided 100. In those instances, the Government has agreed to increase the fee so as to take care of that additional interest charge. Other than that, we pay the interest out of our own pockets. On our fixed-price contracts, which is the great bulk of our business, we pay the interest out of our pockets.

GOVERNMENT'S POLICY COSTS IT MORE IN LONG RUN

Senator BARRETT. But, in the other cases, the Government could borrow money cheaper than you could and, so, it is costing more in those cases; is that right?

Mr. ALLEN. That is right.

Senator BARRETT. I think you have made a very fine statement, Mr. Allen, and I congratulate you.

That is all, Mr. Chairman.

Mr. ALLEN. Thank you, sir.

Senator JOHNSON. Any other questions, Senator Jackson? Any questions, Counsel? Any observations you would care to make?

Mr. WEISL. I think, in fairness to the other witnesses that testified, Senator Stennis, each one of them said they were willing to make any sacrifice necessary to prepare our country for its defense. Mr. Gross specifically testified to that; Mr. Rockefeller testified to that; Mr. Sarnoff testified to that, and others.

Senator STENNIS. Yes. I, of course, was not reflecting on them. That is the general proposition that everyone would testify to, but, when you got down to the specifics and asked them about a direct increase of taxes, my impression is that Mr. Allen was far clearer and more emphatic and positive in being willing to espouse the cause and advocate such a cause. Thank you.

Senator JOHNSON. Any other questions?

The committee will recess until 2:30 this afternoon.

(Whereupon, at 12:15 p. m., a recess was taken until 2:30 p. m.)

AFTERNOON SESSION

Present: Senators Stennis (presiding), Saltonstall, and Bush.

Senator STENNIS (presiding). First, a word to the press. The gentlemen that testified in executive session—Mr. Allen, the two Mr. Douglasses, and Mr. Johnson—all testified on highly technical and highly classified matters, and we do not know of anything that could be issued regarding their testimony.

The only witness we have for the remainder of the day will be Mr. Kindelberger, who will give some very important testimony in closed session and something of interest in open session. We opened the doors so you could come on in and get his statement and hear his open testimony, but it will be fairly brief until we have to go into another executive session.

The committee will come to order. We are going to operate without the use of loudspeakers, which will require the utmost quiet. Pass around copies of the statement, please.

This is Mr. J. H. Kindelberger, chairman of the board, North American Aviation.

Mr. Kindelberger, we are very glad, indeed, to have you here. You have offices, as I see here, in Los Angeles. You also have divisions in Downey, Calif., Columbus, Ohio, Canoga Park, Calif., and Neosho, Mo.

We do not have available here a biography of Mr. Kindelberger, unless you have something there. We will supply that for the record. We know you are a gentleman of competence and capability, and speak with authority on this particular subject. We are glad to have you. You may proceed.

(Biography of J. H. Kindelberger, chairman of the board and chief executive officer, North American Aviation, Inc.):

James Howard Kindelberger, chairman of the board and chief executive officer of North American Aviation, Inc., was born in Wheeling, W. Va., on May 8, 1895.

After taking his early education in Wheeling, he went to work in 1911 for the National Tube Co. in his home town, where he remained until 1913, when he took a job as a civilian draftsman and inspector with the United States Army Engineering Corps.

In 1916, he entered Carnegie Institute of Technology, but terminated his formal education in May 1917 to enlist in the United States Army Engineering Corps. He transferred, after 6 months on civil engineering projects, to the Army Air Service, and, after completing advanced flight training, served as an instructor at Park Field, Memphis, Tenn.

Kindelberger was still in uniform when he went to work as a draftsman at the Glenn L. Martin plant in Cleveland shortly after the Armistice in 1918. In 1920, he became chief draftsman and assistant chief engineer under Donald Douglas, who was then Martin's chief engineer.

When Douglas resigned from Martin to form the Douglas Aircraft Co. in California, he soon wanted a chief engineer. In 1925, Kindelberger accepted the position in California, heading a group of nine engineers. Nine years later, as vice president in charge of engineering, he had more than 400 engineers working under him.

In July 1934, Kindelberger became president of General Aviation Manufacturing Corp. in Baltimore, Md. General Aviation was a subsidiary of North American Aviation, Inc., then a holding company with interests in a number of air transportation and manufacturing firms.

General Aviation was erased from the books on January 1, 1935, and J. H. Kindelberger was appointed president and managing director of North American Aviation, Inc., which has been an active manufacturing company since that time.

With a tiny order for trainers, a fighter that didn't fly, and a shop full of skilled Dutch mechanics, Kindelberger didn't have much to work with when he took this new job in Maryland. He had 9 weeks to build a trainer for an Air Corps competition. Limited to a 40-hour week by the NRA, Dutch called his workers together.

"No overtime," he warned, "or I'll be in the hoosegow."

One night he found the workmen singing and yelling lustily in the plant while building an airplane. One of them explained.

"After 8 hours' work we ring out and go to Helen's place for beer. Then we come back and have fun getting the job done. There's no law against having fun."

They won the competition and got the Air Corps order for the trainers.

On the strength of that order, Kindelberger moved North American to Los Angeles in 1936. Many of the original crew followed the company westward, and are still with the organization in responsible positions.

A skilled engineer as well as a shrewd businessman, Kindelberger had led North American from near obscurity in 1935 to its present position as one of the leading aircraft manufacturing organizations. On May 14, 1948, he was elected chairman of the board and chief executive officer.

Since 1936 the company has designed and built dozens of famous military planes ranging from the famed trainer series to jet fighters and bombers. During World War II North American built 42,683 military planes, representing 14 percent of the total produced in the Nation during that period.

For his contribution to the war effort, Kindelberger received the President's Certificate of Merit in 1948 and in 1951 the French Government awarded him the Chevalier de la Legion d'Honneur. In 1953 Mr. Kindelberger was presented the Exceptional Service Award, the highest honor the United States Air Force can give a civilian.

Following the war, the company continued its design and development of military airplanes for the new jet-propelled era. Having delivered its 50,000th airplane in November 1953, the company today can point to the outstanding fact that North American has built more airplanes than any other company in the world.

The most famous of the company's postwar models are the F-86 Sabre jet series which scored consistent triumphs over the Russian-built MIG-15's in

Korea and the F-100 Super Sabre. The F-100, which holds the official world speed record of 754 miles an hour, and later versions of the Sabre jet, are now in production at Los Angeles and Columbus, Ohio. Other models now in production include the F-86F, F-86H, and F-86D, the latter the Air Force's only single-seat high-altitude interceptor designed for the continental defense of the United States. The Sabre was America's first sweptwing production fighter.

Other North American planes of recent years are the Navy FJ Fury series, first United States operational jet fighters to take off and land on a carrier; the B-45 Tornado, the Air Force's first 4-jet bomber; the Air Force T-28 trainer, which won a design competition over 12 other manufacturers; and the Navy AJ-1 Savage attack plane, first designed specifically to carry the atom bomb and the heaviest airplane to land aboard a carrier.

Not content to probe every possibility of airplane design, Kindelberger also has plunged North American into research and development of guided missiles, electronic equipment, and basic research on atomic energy.

"We want to be in on the ground floor if anything new is uncovered," he explains.

Kindelberger is a fellow and former president (1950) of the Institute of Aeronautical Sciences, a past vice president of the Aeronautical Chamber of Commerce of America, and is now a governor of the successor organization, the Aircraft Industries Association of America. Early in 1942 he was elected first president of the Aircraft War Production Council, an organization of the 8 major aircraft manufacturers of the West Coast.

On June 14, 1939, the degree of Doctor of Engineering was conferred on him by Brooklyn's Polytechnical Institute, and in 1950 he was awarded the Alumni Merit Award Certificate by the Carnegie Institute of Technology.

He is a member of the Society of Automotive Engineers, the Manufacturers Aircraft Association, and a director of the California State Chamber of Commerce. In 1947 he served on the advisory council to the Congressional Aviation Policy Board.

Kindelberger is a son of Charles F. and Rose Ann Kindelberger. He and his wife, Helen Louise, reside in Pacific Palisades, Calif.

Senator STENNIS. In keeping with what the other witnesses have been asked to do, if you will stand, please, and be sworn.

Do you solemnly swear your testimony here will be the truth, the whole truth and nothing but the truth so help you God?

TESTIMONY OF J. H. KINDELBERGER, CHAIRMAN OF THE BOARD, NORTH AMERICAN AVIATION, INC.

Mr. KINDELBERGER. I do.

I am grateful for this opportunity to appear before this committee to express my views on the situation facing us.

I had expected to discuss the use of manned aircraft in relation to the missile and am most happy to find that my good friends in the industry who have already testified have almost unanimously agreed on the necessity for the maintenance of manned aircraft for many years. I think that Mr. Gross' and Mr. Lanphier's statements were excellent.

I have one small quarrel with Mr. Lanphier, however. I think he was too optimistic about the missile program.

I am appending a list of the principal products which we manufacture and shall be happy to discuss them as the committee may desire.

THE PROBLEM OF THE PENTAGON'S COMPLEXITY

I have given a lot of thought to the question of straightening out the Department of Defense. I must admit that there is little I can suggest. It reminds me of a skein of yarn with which the cat has

been playing for years. It is badly snarled and loose ends stick out all over. I am sure, however, that it cannot be untangled by wrapping more yarn on the outside.

I shall be very happy to answer your questions as far as I am able.

INFORMATION CONCERNING NORTH AMERICAN AVIATION, INC., GENERAL OFFICES, LOS ANGELES, CALIF.; LOS ANGELES DIVISION, LOS ANGELES, CALIF.; AUTONETICS DIVISION, DOWNEY, CALIF.; MISSILE DEVELOPMENT DIVISION, DOWNEY, CALIF.; COLUMBUS DIVISION, COLUMBUS, OHIO.; ATOMICS INTERNATIONAL, CANOGA PARK, CALIF.; ROCKETDYNE DIVISION, CANOGA PARK, CALIF., NEOSHO, MO.

INFORMATION CONCERNING LOS ANGELES DIVISION OF NORTH AMERICAN AVIATION, INC.

Weapon system 110A

The Los Angeles division recently won a design competition to develop a strategic bomber to replace the B-52. This advanced weapon system will cruise at speeds in excess of 2,500 miles per hour for intercontinental distances. It will provide the Strategic Air Command with:

1. Quick reaction capability.
2. Extremely accurate delivery capability.
3. Reliability and flexibility inherent in manned vehicles.
4. Recall capability.

System 110 will be produced primarily at Los Angeles but will be extensively subcontracted throughout the country.

F-108

The F-108 long-range interceptor is also under development at the Los Angeles division. It is designed to intercept enemy bombers and cruise-type missiles far from the borders of the United States. It will cruise at high supersonic speeds, for great distances. The F-108 contains a powerful long-range radar and missile system developed by the Hughes Aircraft Co. The F-108 weapon system will complement air defense missile systems and provide all-important flexibility to prevent our air defense from becoming a Maginot line. The F-108 will be produced at Los Angeles.

X-15

The X-15 program was initiated jointly more than 2 years ago by the Air Force, Navy, and the National Advisory Committee for Aeronautics. It is presently designed to explore extreme temperatures, speeds, and altitudes. It is designed to operate in space. We have proposed to the services an extension to the X-15 program which would vastly increase its capabilities.

F-100 program

Advanced models of the F-100 Super Sabre are presently being produced at Los Angeles but will phase out next year. Both the single place F-100D and the two-place F-100F provide supersonic nuclear and conventional store delivery capability to the Tactical Air Command. This weapon system would undoubtedly be the prime means of attaining air superiority in any "limited war" for several years to come. More than 2,000 have been produced at both Los Angeles and Columbus plants.

The jet utility trainer is being built on company funds to provide a modern, efficient, and economical replacement for the aging propeller fleets in both the Air Force and Navy. It will make its first flight next summer and will be offered to the services "off the shelf."

INFORMATION CONCERNING AUTONETICS DIVISION OF NORTH AMERICAN AVIATION, INC.

B-52 ASM (WS-131B) guidance and flight control

Guidance and flight-control system for a 350-nautical-mile, air-launched cruise-type missile being developed by NAA, MDD. Autonetics guidance system, designated N5G, is based heavily on N5A and N5B Air Force technical development autonavigators. N5G would have application to other missiles, such as Navy Raven, B-58 ASM or surface-to-surface missiles. Design will be completed in October 1958. Substantial quantities would be produced during 1959.

N2C-N2F program

The Air Force is currently considering application of N2-type stellar inertial equipment to reconnaissance systems. The N2 was developed for precision missile navigation under the Navaho and Snark missile program. It is especially applicable for long-time-of-flight aircraft where precision navigation is required without radar checkpoints. Could be applied directly to AEW aircraft to give them precise position over areas such as water or wastelands, where radio or radar navigation may be impractical.

N2J stellar inertial autonavigator for IBM WS-110A

Autonetics is under subcontract to International Business Machines to provide stellar-inertial guidance equipment, designated N2J, for use in bombing navigation IBM is developing for WS-110A. N2J has daylight star tracking ability, making it possible to precisely determine position. The N2J has much in common with N2C-N2F, discussed above.

Autonavigator developments general

Utilizing our lightweight inertial developments and follow on of larger precision "Navaho" type systems—numerous developments for advanced missiles, aircraft, and ship navigation.

Radar, data recorders and terrain clearance radar

Numerous high performance radars utilizing our monopulse techniques for terrain clearance, bombing, and fire-control systems.

Reins bomb-navigation system for A3J

Autonetics has complete system responsibility for B/N system. This includes systems management of three major subcontractors—Convair, Eastman Kodak, and Raytheon. First complete system being installed for flight testing this month.

Digital computers

We have an Army Signal Corps program which involves the manufacture of a transistorized digital computer for conversion of reconnaissance information. This computer is very similar to the RECOMP computer which was developed for the Air Force. This computer utilizes our precision disk memory.

Projected optical display

This is a contract with the Raytheon Manufacturing Co. to provide optical display of radar and sighting information on the pilot's panel.

Automatic checkout equipment

Autonetics has automatic checkout equipment which was developed for Navaho and which will be utilized for checkout of Atlas missiles. Programs are underway with Convair and RCA for this equipment.

Automatic touchdown system

Autonetics has performed considerable work in automatic landing with fast aircraft like the X-10 and is presently conducting study for automatic touchdown of aircraft.

Additional projects under guidance study with company funds

Raven: For BuAer, air-to-surface missile.
 Eagle: BuAer, airborne fleet defense system.
 Subroc: For BuOrd, advanced submarine antisubmarine missile.
 Polaris: For Special Projects Division, BuOrd—Submarine surface-to-surface missile.

SR-168: To provide inertial guidance for aerial release from aircraft such as 110-A, B-58, B-52.

INFORMATION CONCERNING MISSILE DEVELOPMENT DIVISION, NORTH AMERICAN
 AVIATION, INC.

Current military products

Navaho. After the cancellation of the Navaho program, the Air Force requested further flight testing of the intermediate range test vehicle XSM-64 to demonstrate the technical feasibility of the system and to prove out the advanced design concepts. There are several significant research and development programs within the Navaho development which are being completed for application to future weapon systems.

GAM-77. This is an air-to-surface missile for the B-52 and is currently under development.

Research work at missile development division

Under contract with the Air Force Office of Scientific Research, a boundary layer investigation program applicable to ICBM and other advanced performance weapons.

In addition to the existing contracts, the division is engaged in several important study programs on advanced weapons and space technology. These are presently classified, but include tactical ballistic missiles, nuclear propelled missiles, hypersonic glide bombers, and systems for both early space exploration and later massive space exploration systems.

INFORMATION CONCERNING COLUMBUS DIVISION OF NORTH AMERICAN AVIATION, INC.

Current military and nondefense products

A3J heavy attack aircraft.—A supersonic carrier-based all-weather bomber now in production for the United States Navy. This all-altitude attack aircraft has been developed for the Navy with NAA, Columbus, as weapon system manager. Advanced versions of the A3J are under study. The Air Force has shown considerable interest in the A3J since this aircraft fulfills the tactical bomber and reconnaissance requirements of the Air Force.

T2J basic trainer.—The T2J is an all-purpose basic jet trainer now in production for the Navy. This two-place trainer has been developed to provide an optimum vehicle for training the naval aviator.

FJ4B light attack aircraft.—The FJ4B is the result of a long period of engineering development to provide an excellent carrier-based aircraft for the Navy. This production will be completed by May 1958.

R4Y modernization.—NAA at present is overhauling the R4Y (Convair transport) for the Navy.

Defense subcontract product

NAA has contracted for the production of the Chance Vought F8U-1 fuselage midsection. Additional work is being accomplished on the Chance Vought F8U-3 control surfaces, wing droop leading edge, ventral fin and wing flap.

Nondefense product

NAA is fabricating aluminum curtain walls and panels for building construction.

INFORMATION CONCERNING ATOMICS INTERNATIONAL DIVISION, NORTH AMERICAN AVIATION, INC.

North American's activity in the atomic-energy field started in 1946 when we began studying applications of atomic energy for aircraft and missiles. While we are now heavily engaged in peaceful applications of the atom—that is, power generation, medical and industrial research, and so forth—we are also doing a considerable amount of work of a military nature, including important work for a proposed satellite.

North American Aviation recently joined Demag A. G., a leading German heavy machinery and equipment firm, in the formation of Interatom, which will be engaged in design and manufacturing of nuclear reactors and related products.

INFORMATION CONCERNING ROCKETDYNE DIVISION OF NORTH AMERICAN AVIATION, INC.

Current military products

Missile propulsion systems.—Atlas: The propulsion system consisting of a booster and a sustainer for the Atlas ICBM.

Thor: The propulsion system built for the Air Force Thor IRBM.

Jupiter: The propulsion system for the Army IRBM.

Redstone: This engine has been produced in quantity for the Army.

Navaho: Although the Navaho contract was terminated in the summer of 1957, some are continuing to be flight-tested. Considerable interest is being shown in the booster of the Navaho for proposed space flight or orbital missions.

Aircraft rocket engines.—Rocketdyne is building several small rocket engines for aircraft application.

Development work at Rocketdyne

1. *Improvement of the present LOX-JP engines.*—Studies are being carried on and development work is in progress on the reliability and simplicity of propellant combinations of these engines, as well as for increasing the thrust of these existing size engines.

2. *Higher thrust engines.*—Development and manufacture to some extent is being carried on of a larger engine of the next anticipated thrust range, as well as clusters of these larger engines, and a proposal is being developed for a much larger engine suitable for manned satellite stations and moon landings.

3. *High energy engines.*—Studies are being performed and limited development work is being carried on on engines using high energy and at the present time unusual fuels.

4. *Nuclear energy rocket engines.*—Studies have been conducted for over a year under Air Force contract and development work is being performed on this project.

5. *Ion propulsion.*—Feasibility studies and research are being performed on engines using ions as propulsion. These engines would have a very small magnitude of thrust. It would be used for control and propulsion in space.

6. *Storable engines.*—Studies are being made and contractual coverage is being sought for the conversion of IRBM engines to storable propellents. The use of storable propellents with them would remove both logistic problems and insure a faster reaction time.

OTHER NORTH AMERICAN AVIATION, INC., ACTIVITY

Astrodyne, Inc.

North American Aviation, Inc., together with Phillips Petroleum Co., recently formed Astrodyne, Inc., to develop and manufacture large solid propellant rocket engines. It is expected the chemical experience of Phillips and the rocket hardware experience of North American Aviation will complement each other in developing advanced solid rockets.

Senator STENNIS. Mr. Counsel, do you have any questions to ask Mr. Kindelberger in open session?

Mr. WEISL. Yes, sir.

Mr. Kindelberger, how long have you been in the aviation business?

Mr. KINDELBERGER. About 40 years.

THE DEPENDABLE MISSILE IS A LONG WAY OFF

Mr. WEISL. And based upon that experience, you make the statement here that you thought Mr. Lanphier was too optimistic about the missile program. Mr. Lanphier told us that others were too optimistic about the missile program.

Would you care to explain that, please, to the committee?

Mr. KINDELBERGER. I am even more pessimistic than Tom. I think it is going to be a long, long time before we have what I consider dependable, reliable missiles. I am talking about the ballistic area. They are intricate beyond human belief. They have not been developed. If we take an airplane of equivalent complication, we think nothing of spending 2 or 3 years after it is built getting all the bugs out of it.

That means we fly it hundreds of hours with an operator aboard observing it. With a missile you get 2 or 3 seconds, 2 or 3 minutes, or a pad flight of 6 inches, and the accumulated information that you get back is all telemetered, which is very, very much less than you can get from an airplane. I am just comparing it with an airplane, and it takes a long while to accumulate that test time and correct the defects; and there are many of them.

Now, these are comparatively new things we are dealing with. Almost all of them have been invented recently, and there have been development launchings and eventually I am sure they will work; but there is a great difference in my mind between ready operational missiles and something that you count down for 10 hours and then start working on again tomorrow and maybe the next day and a week later you fly it. When I say ready, I mean when you push the button it goes.

Mr. WEISL. Mr. Kindelberger, you state that you have given a lot of thought to the question of straightening out the Department of Defense. I think that you could probably give us some specific suggestions as to how it could be straightened out.

Mr. KINDELBERGER. What I was referring to by the loose ends and the snarl is the fact that it seems to me that every time we get into trouble or every time something new happens or some new person comes in, they appoint a committee, and a committee very seldom accomplishes anything. A committee is a grand thing to discuss problems and advise, but they can't take any action. They can only say no.

Senator STENNIS. Cannot take any what?

THE COMMITTEE IS SELDOM CONSTRUCTIVE

Mr. KINDELBERGER. They cannot take any action. A committee can say no and stop things, but they very seldom can be constructive and push things ahead.

I have no idea how many committees there are. I do not know whether you could count them, but what I was referring to is the general tendency to pile committee on committee, czar on czar, person on person, to the point where you don't know what you are doing. I have read these other statements and I don't just want to sit here and repeat them, but I don't believe that anybody has been satisfied with the decision-obtaining process.

Sometimes we wait years for a decision. Sometimes we get it today and it is gone tomorrow. It is just a big vast intricate thing and I just meant that I don't think you can wind another committee or another czar or another group on the outside of a tangle and straighten out the tangle.

Mr. WEISL. I am sure you can tell us specifically one or two things that you would do if you had the power to do it, to untangle this web.

Mr. KINDELBERGER. That is really a little difficult. That is really something for a management consultant to spend a while on, and I think they would have to. But, for instance, something that is started is usually started as a study contract. You have to work with a group in Dayton, a group in Baltimore, another group back here in the Pentagon, and that process may be repeated a dozen times. Now, these groups are not nice homogeneous groups. They are scattered over here in the Pentagon and over there and over there in Baltimore, and about half my people, it seems to me, are out giving briefings, just to keep ourselves ahead. I am glad they listen to us, but it takes a lot of good people a long while to cover this widespread highly involved group. And as I said before, any one of them can say "No."

It is just like putting a nickel in a slot machine. You pull the handle and you get a lemon and you put another one in. You have to get three or four of them in a row and hold them there long enough for them to say "Yes." It takes a lot of nickels and a lot of time.

Mr. WEISL. There is an insert in the record indicating the various weapons systems that your company is engaged in. Now, you did succeed in one or two instances in cutting the lead time despite this skein of yarn in the Pentagon, did you not, and I refer specifically to the F-107.

Tell us how you were able to do that.

THE F-107 WAS READIED IN 18 MONTHS

Mr. KINDELBERGER. In the case of the 107, the job was given us with no great preliminaries as an improved F-100 in which we were engaged, but the study being made on it indicated we should start from scratch. We did and nobody helped us very much, so we got it ready to fly in 18 months. There is nothing worse than too much help.

Mr. WEISL. Why cannot that be done with all of the weapons systems that you make? It may be a foolish question but I am going to ask it anyway.

Mr. KINDELBERGER. More of it could be done than is done, I am sure, but that is not the system.

Mr. WEISL. How were you able to get around the system in the case of the F-107?

Mr. KINDELBERGER. We just went ahead and did it, most of it, and then we were pretty well along by the time anything was picked up. We were working with one group in the service instead of going through all the systems, because it was done, in the beginning, as an improvement on the F-100 which was in production.

Mr. WEISL. Your company produced the rocket engine that is being used for the Atlas and for the Thor and for the Jupiter, and that is being copied by the people who are making the engine for the Titan. Tell us how you went about getting that job done.

Mr. KINDELBERGER. Well, in 1945, along toward the end of the war, we decided to organize a definite missile group. At that time, we were studying a ballistic missile. We had definite ideas about what we wanted to do worked out along with the Air Force, and of course it required an engine.

THEY EXPERIMENTED WITH THE V-2 ENGINE

The only engine there was in the world that we could get hold of was a very heavy V-2 engine made by the Germans. So we fooled with that a little while just to get the hang of it, and then started in designing a bigger engine.

Now, it was about 1950 before we got rolling. When we started, nobody was particularly interested in rocket engines, just as nobody was particularly interested in going ahead with guidance. Quite naturally the companies that had been doing that sort of work wanted to get back to their commercial work, from which they had been away for 5 years.

We had no commercial work. In fact, we had no work, and we went ahead with this engine. We bought a mountain back in Ventura

County, at Santa Susana, built the roads, put in the water, put up part of the first test stand, and started working there.

That has become a very great, wonderful institution, and I am very proud of it.

We developed these engines over a period of time, engines of great reliability, and we are constantly improving them, but it was the fact we started way back there and that we continued; although the course of the missile for which they were designed was changed many times, the engine is a constant.

In other words, we knew that no matter who finally got to build the missile, we would need these big engines, so it was almost a separate process.

The same with our guidance system, because there was not anything like a precision guidance system in those days, and this was the first inertial guidance system ever built. And we went ahead also with studies on high temperatures, because the missile that we finally determined to build, which was the Navaho, was an air-breathing missile which flew for several hours in the atmosphere at a very, very high Mach number, to the point where the wings got up to 700°, which is not cold. We had to learn how to make structures which would be strong at 700°.

Aluminum, for instance, loses half its strength at 350°. Titanium is ragged at 700°. So we had to go to a lot of titanium where we could use it, and stainless steel in other places.

We also had to make a hydraulic system to operate at 700°, and bearings, bushings, all of those things had to be developed.

They have been developed now.

The fact that we kept those lines of endeavor progressing without relation to the final product meant when we switched to this air-breathing missile we could still carry on with exactly the same research. The engines kept developing in size and reliability.

THEY MADE MANY ENGINES FOR THE REDSTONE

As an example of reliability, we made many engines for this Redstone project. The other day they took one out of a can where we sealed it up 2 years ago, bolted it on the missile with no test, and fired it. It fired perfectly. And that took a lot of time and a lot of effort.

You see, when you talk about these engines, you are talking about a very interesting thing.

For instance, an engine that will produce 150,000 pounds of thrust, we will say, will burn about 40,000 pounds of fuel in a minute. Forty thousand pounds of fuel is a lot of fuel, and yet that fuel must be fed into the engine in proper ratio to the oxygen just as in your car. It takes 2,800 horsepower to run the fuel pump. The fuel pump is driven by a gas generator which is about a foot in diameter. The gas generator receives fuel and oxygen and makes expanding gas that drives a turbine at 30,000 revolutions per minute. Pumps are geared to the turbine shaft, and the pumps have to push the propellents at the proper relation of oxygen to fuel—into the head of the engine at a pressure of 800 pounds per square inch.

The temperature inside the barrels goes up to 6,500°. There is not anything that will stand 6,500°. It goes into a gas be-

fore that. So we had to cool it. We cooled it so successfully that you can put paint on the outside, which we do in our tests, and it won't blister. And it has to have exactly the right shape, exactly the right size, because if you got a little irregularity in there you can shake any missile in the world apart.

But that is an example of what it took to do this, and we have gone far beyond that and are continuing to go on.

Mr. WEISL. It has been suggested here by some of the witnesses that the country ought to be working on an engine with a million-pound thrust. Would it be possible to develop such an engine?

Mr. KINDELBERGER. I believe so. But not quickly.

We are working on a bigger engine, and it is nothing that you can scale up, because the flame propagation, the heat transmission, the vibration and flow do not respond to any well-known law. It is more an empirical sort of thing. And, of course, if you go up to 3 times the power, you have got a pump with 3 times the power to build and make work. We have made engines, putting several engines together, of a very large horsepower, but that was three barrels.

Now, we can take and make one of a rather medium size, and we can put 2 or 3 barrels together. When I was a kid, I used to go out to the farm and they had a pump out there driven by an old Fairbanks engine which coughed and choked and it had a large single cylinder.

When they got to the more efficient engines, like you have in your car, they didn't make one several feet in diameter, which they probably would have had to have. They made eight little cylinders like that, and it works just fine, and we will know for a long time a lot more about these smaller units and the way to combine them than you will know about a single huge million-pound barrel.

Now, then, as far as using these engines on a ballistic missile is concerned, you don't need more power. You have got plenty.

Senator BUSH. How is that?

Mr. KINDELBERGER. The ballistic missile is likely to get smaller rather than larger.

Senator BUSH. Will you repeat that? You said you don't need—

POWER FOR BALLISTIC MISSILE SUFFICIENT NOW

Mr. KINDELBERGER. You don't need any more power than you now have for a ballistic missile. The missile is apt to get smaller and not larger, because we are working on new fuels, and a very slight improvement in the fuel saves a lot of weight when you are carrying as much fuel as we are. The reduction in the amount of fuel means that you have a much lighter instrument and, therefore, it takes less power to boost. And we are experimenting with hydrogen, with fluorine, and many mixtures, some of which are very dangerous.

For instance, we just bought an area up in Nevada, thousands of acres, where we intend to experiment with fluorine. We would do it in Santa Susana, but fluorine is a very active and very dangerous gas. If you ever had an explosion in a large-scale test, you would kill people. So we are planning to do it out in the country.

Now, the use of improved fuels is gradually becoming known—I mean we know better every day how to do it. And that will be used, and it will greatly improve the thrust-weight ratio, what we

call the specifics of the engine, and as it is improved you can come down in weight. I think we have seen the peak of the ballistic-missile weight. You can come down on weight and go up on warhead, if you want to. But it is common knowledge that warheads come down, too, as they are improved.

Mr. WEISL. It may be, Mr. Kindelberger, that it will become necessary for us to project a heavy satellite in outer space; then you need an engine with as powerful a thrust as you can find, do you not?

Mr. KINDELBERGER. I said for the ballistic missile you would not need it.

Now, for a space engine we have dreamed up things up to 5 million pounds of combined thrust. It all depends on what is space, where you are going, and what you are going to do there. If you are going to space platforms, you can spend \$5 billion or \$6 billion on it, and you will need a big engine to hoist the stuff up. The day after you get it finished, Russia can blow it out very easily, because it is very easy to send something else up in the same orbit and knock out what is there.

So whether they would permit that or not I don't know. But we have been able, with the present powerplants, to put very heavy satellites in space, if we had wanted to do it, and a useful satellite today isn't necessarily a large one. As you know, the Vanguard is 18 pounds. The heaviest one that the Russians put up is a thousand pounds. It does not take power beyond that which we have at our command to put that up.

WE HAVE ENOUGH POWER TO GET TO THE MOON

But if you want to go breaking stuff into space or if you want to carry a man to the moon and get him back, it takes a lot of power, more than we have got now. But for the moment, we are in good shape with power for ballistic missiles and we are in good shape for satellite power, and we can even get to the moon with what we have.

Mr. WEISL. Mr. Kindelberger, one final question, and my time is up: Can you tell us without revealing classified information about the B-110 which you have described in the annex to your statement.

Mr. KINDELBERGER. The B-110?

Mr. WEISL. I think it is the B-110.

Mr. KINDELBERGER. Well, it is the Weapons System 110. It is pretty hard to talk very far on that without getting into the angles of security.

Mr. WEISL. Let us not talk about it then because we do not want to get into security problems.

Mr. KINDELBERGER. I can tell you this much about it: that the art of building it gets nothing from any experience any body has ever had before in building bombers. It uses different material, it is an entirely different aerodynamic conception. It has new, different engines, designed for this terrific speed. It operates at very high temperatures, and then I start running into trouble on security.

Mr. WEISL. Thank you, Mr. Kindelberger.

Mr. Chairman, my time is up.

Senator STENNIS. Thank you, Mr. Counsel. I have only two questions, Mr. Kindelberger. You speak of these powerful engines and the need of them in the field of satellites and you speak of the possibility

of launching one to the moon, say, carrying a man, and returning. You speak of that in a serious vein, I am sure.

Mr. KINDELBERGER. I know it can be done.

Senator STENNIS. You think it can be done?

Mr. KINDELBERGER. I do not know who would want to go there or why, but I think it can be done. I am talking only about the scientific problems.

Senator STENNIS. Yes. You were speaking there of the thrust of these engines and the possibility of making such a lift. You think that is already foreseen?

Mr. KINDELBERGER. We can go to the moon now. We can send an object to the moon. We can put an object in orbit around the moon. In fact, we have proposed that to the services, proposed doing it in a couple of years, because we happen to have existing hardware from the Navaho that is powerful enough to do it.

Senator STENNIS. You do have existing hardware?

Mr. KINDELBERGER. Standing out in the warehouse, yes.

Senator STENNIS. Do you see some practical advantage or some practical results in putting an orbit around the moon?

ION POWER FEASIBLE OUT IN SPACE

Mr. KINDELBERGER. Well, if we did it before the Russians, it might have a good political advantage, but practically, I can't see too much advantage beyond the orbit region where satellites can operate. However, we are studying it, like every other company in the country. There are about 25 solutions to most of these problems. In fact, we have been working for quite a long while on an ion engine which produces only 1 pound of thrust but it produces that in space where there is no oxygen. That small thrust applied to a huge mass in space where everything is weightless, and where there is no friction as there would be in the air, will accelerate it to unbelievable velocities in a few months application of that power; however it is only a study program.

If possible, we will go forward with some experimental work. But my belief is that we are going to be using manned aircraft for many, many years, and I think we are going to have to fight peripheral wars and we are going to have to use the type of airplanes that we can project from here on for a long time.

I am sure we will be using a manned bomber in 1970, and I think we will be using a manned interceptor for a long while, too.

Now, I am not saying that the missiles are not good. They are, they are wonderful. I am familiar with every part of them.

Senator STENNIS. Do you envision a use of the missiles in conjunction with the manned bombers?

Mr. KINDELBERGER. Certainly.

Senator STENNIS. That is what you really see in the future for the missile?

Mr. KINDELBERGER. I certainly do.

Senator STENNIS. As I understand it.

Mr. KINDELBERGER. You cannot use a missile very successfully in one of these brush wars or peripheral wars, but you certainly can use any kind of a bomber that you have got in that type of war. And you

cannot use a missile when you don't know where the target is because a missile does not have any brain. It only has in it what you wind up and put in it, and it is well known that you don't know where the targets are, many of them. As a matter of fact, we don't know where our cities are here. We found at El Paso, that it was a mile and a half out of place.

Senator STENNIS. Is what?

Mr. KINDELBERGER. El Paso is a mile and a half away from where it is supposed to be. [Laughter.] We flew down there with our Navaho missile equipment, which is very accurate, and we began getting a constant error there at El Paso. Somebody thought maybe this thing wasn't crazy, maybe it was El Paso, so we made a very expensive survey to find out and the El Paso benchmark is a mile away from where it was supposed to be.

Senator STENNIS. Not over in Mexico?

Mr. KINDELBERGER. No, still in Texas. [Laughter.]

Senator STENNIS. Well, you made a very interesting comment here, too, on the future of the missile, as you see it, the size of these engines. I think you made that very clear.

One word now about the Pentagon. We have heard many witnesses, including you, state of their frustration and their—in some of their dealings with the setup in the Pentagon of the layers of committees and particularly those without authority, but which have the power of negotiation.

Do you have any examples that you could give us of your own experiences that cost you money or cost the Government more money or cost time and time is—

Mr. KINDELBERGER. Time is lost frequently like this. You see, there is always a committee meeting going on over here, and every time I am trying to find the Secretary of the Air Force or somebody with whom I have business, he is testifying at some committee, and if he is not testifying he is preparing to, and if he is not preparing to he is cleaning up what he said the last time.

Senator STENNIS. You are talking about congressional committees too now, aren't you?

Mr. KINDELBERGER. I certainly am, sir.

Senator STENNIS. Put it right on the record. That is all right. Just go ahead.

Mr. KINDELBERGER. But that is a fact. There is an amazing amount of time taken by the people that do the work, the people that make decisions, in preparing for and going into congressional committees.

I was told the other day that there are five of them, including this one, going on or planning to go on and running clear up until June.

You see it means it is awfully hard to get a decision while they are trying to figure what they are going to tell you gentlemen and others.

THEY ALWAYS APPOINT A COMMITTEE

But on these committee, I don't know how many there are, a solution to all problems has always been to appoint another committee.

Every service—Mr. Symington here can tell you that when he was chief of the Air Force we had very little of it. We had a few scientific advisers, but as it grew and improved, they got more hooks to

hang another committee on until any general or anybody with any real rank has to have a committee.

Now, the President has to have a committee, and I don't know who is the boss committee. I think there is a committee of committees, but they all take up a subject and they kick it around and half the time it dies, but in the meantime we wait and wait and wait and wait. They appoint a special committee for a special reason and it usually keeps on going.

Maybe I am a little too bitter about it, but it just seems every time I try to do something, I trip over a committee.

Senator STENNIS. I think your comment is very good indeed to describe the situation as you find it. What about any delays in connection with getting funds approved, getting funds for a different part of a project, getting them released over there, allocated or whatever the term may be?

Mr. KINDELBERGER. Of course, that is quite a game because they have limited funds in many projects and they cut them and divide them and change them.

One of the things, of course, that affects us all very greatly, they give you a little at a time and then you run out of money. And when you run out of money, you are supposed to lay everybody off, which you cannot do. So you dig up the money from the bank, and then later you keep after them until the paperwork gets cleared and you get your money. But right now we have at least \$25 million that we ought to have been paid that is being held up by paper machinery somewhere.

Senator STENNIS. You mean that has already been earned and has not been paid to you?

Mr. KINDELBERGER. Oh, sure. We got \$12 million into the bank the other day on one contract for which we should have had clearance and the money last July.

Senator STENNIS. That is very interesting and very important, but I was thinking primarily in that question of funds that are held up that keep you from moving into action on a contract or on a project.

Mr. KINDELBERGER. We go ahead with it. We always collect somehow sometime, but if we waited for funds or if we stopped working every time the funds ran out, we wouldn't have anybody working for us.

Senator STENNIS. My idea was, though, that they could not give you the go ahead signal or award you a contract until the funds had been allocated?

Mr. KINDELBERGER. They can't now. They used to do that, but now this incremental funding is a new thing.

Senator STENNIS. My time is about up. Do you experience delays that are hurtful in your time schedules because of this failure to allocate the money?

THEY DON'T WAIT UNTIL THE GOVERNMENT PAYS

Mr. KINDELBERGER. We don't only because we take it on ourselves and borrow the money and go ahead and collect it later.

Senator STENNIS. My time is about up. Thank you very much.

Senator Saltonstall.

Senator SALTONSTALL. Thank you, Mr. Chairman.

Mr. Kindelberger, I think the chairman has covered almost everything that I had in mind. Broadly speaking, there are three types of criticisms: delays in making decisions, slowness of payment, and possibly the type of contract employed.

Now, you have described the first two to Senator Stennis. Are you interfered with at all by the type of contract that you have with the Pentagon? Do you have any difficulties along those lines?

Mr. KINDELBERGER. No, I think the contracts are all right, but I don't like the way the payment has been chiseled down. Mr. Allen treated that so beautifully this morning that I shan't repeat it, but the basic contracts, the cost plus fixed fee type which is used on development work, and the incentive-type contract on production are well known and well administered. It may take a long while to get them through the paperwork, but you do get them.

Senator SALTONSTALL. Approximately what percentage of your overall business is with the Government, if you care to say?

Mr. KINDELBERGER. About 99.9.

Senator SALTONSTALL. So that you really have one customer, so to speak?

Mr. KINDELBERGER. Have what, sir?

Senator SALTONSTALL. You have one customer?

Mr. KINDELBERGER. One customer; yes.

Senator SALTONSTALL. So that you are dependent for your payments, for your decisions, for your employment, on the decisions that the United States Government makes and on the payments that it makes to you?

Mr. KINDELBERGER. That is right.

Senator SALTONSTALL. Mr. Chairman, I would like to ask Mr. Kindelberger is there any objection to putting into the record after the very brief and short statement that you made the appendix to your statement showing what business you do with the Government?

Mr. KINDELBERGER. Not at all.

Senator SALTONSTALL. Then, Mr. Chairman, I would ask unanimous consent of the committee that that goes in as a part of Mr. Kindelberger's statement, unless the counsel has some objection, unless you know of some reason why it should not.

Senator STENNIS. I think it is an excellent suggestion, Senator Saltonstall, that the remaining part of the information and comment, too, of the statement go into the record following that which Mr. Kindelberger read at the beginning.

Is there objection? The Chair hears none and it is so ordered, Mr. Reporter.

(The material referred to appears following Mr. Kindelberger's statement.)

Senator SALTONSTALL. Mr. Kindelberger, if I might press you just a little, you have no other suggestions to make regarding the improvement here in the Pentagon or in any of the Government agencies with which you deal except to eliminate some of the committees and the delay that is caused by them?

Mr. KINDELBERGER. I am sure that fewer people around would help, but I really don't feel expert on that. There is such a thing as being frustrated and bumping your head, but when you get used to it, it is

like the chair that the wife leaves in the middle of the floor all the time. You walk around it eventually and don't know it is there.

Senator SALTONSTALL. You look so calm and patient that I do not believe you have gotten used to it yet.

Mr. KINDELBERGER. Well, it is there and it is a frustration, and yet I hesitate to tackle that. I am an engineer.

AUTHORITY TO MAKE DECISIONS AT PLANT WOULD HELP

Senator SALTONSTALL. May I press you just once more. Should there be more decision left to the local government official at your plant, for instance, or in the locality?

Mr. KINDELBERGER. I think that would help tremendously. In the case of this 107, that was done largely that way.

Senator SALTONSTALL. Thank you, sir.

Senator STENNIS. Thank you, Senator Saltonstall.

Senator Symington.

Senator SYMINGTON. Mr. Kindelberger, it is a privilege to see you here.

Mr. KINDELBERGER. Thank you, sir.

Senator SYMINGTON. You are known as the greatest of all fighter-plane producers, and I think you made 15,000 of 1 model bomber, did you not, at one time?

Mr. KINDELBERGER. We made 10,000 B-25 bombers.

Senator SYMINGTON. That was the bomber that Jimmy Doolittle used to bomb Tokyo, was it not?

Mr. KINDELBERGER. That is right.

Senator SYMINGTON. I was interested in your comments about committees. We have great interest in committees now on the Hill, but I think it is fair to the Congress to say that the interest came because of the surprise about sputnik, did it not?

Mr. KINDELBERGER. Yes, it did.

Senator SYMINGTON. I leave it to your decision as to why there was such a great surprise about sputnik. A lot of informed people knew what the Russians were doing, did they not?

Mr. KINDELBERGER. That is right.

Senator SYMINGTON. But the American people did not know it, and that is why they were so surprised.

Mr. KINDELBERGER. Well, as far as sputnik is concerned on its own, it did not mean too much. I mean sputnik as an actual act of sending a mass into space did not necessarily mean a lot, but the fact that it showed that Russia was where she was and the fact that it got so much publicity and the fact that we reacted so quickly to it, I think caused a great deal of excitement.

I was in Europe when it happened, and I did not notice any tremendous excitement the first day or so, but the wave that came back from here seemed to get people all stirred up and then it was terrific. I think just a recognition that Russia was capable of putting this object up there meant everything.

Now, of course, we are a little stupid at times. We could have put that up there if we had wanted to before. There was an engine available 3 years ago to do it, but we were not trying to do it that fast. We had an easy schedule because it was purely a scientific experiment.

PUBLICITY ON VANGUARD ILL ADVISED

But then when we decide to do it, we get excited, and we say that the Vanguard is going to fire at 2 o'clock Wednesday afternoon on X-date. The chances of that happening, that it would fire at that time are about 1 in 10 billion in the state of the art with which we are working. I never heard of it being close to that. And so we publicize that, and, of course, nobody asks the Martin Co. if they can do it and nobody asks Dr. Hagen, who is in charge of the job with the Navy, if he could do it. They learned about it when they were told. It was all out by that time and the public was waiting and then it didn't happen, and that hurt us worse than the sputnik.

I was talking to a man from Singapore the other day, a very intelligent gentleman, and he said actually he thought the fact that the Vanguard did not go off after all its publicity was really more painful to the people there than was the fact that the sputnik went off. We don't know how many sputniks they have fired that have been bad, we don't know how many attempts they made, how many were good and how many were failures. We know that one was good and we heard about it when it was there.

Senator SYMINGTON. Let me ask you this question.

We have now gotten very interested in the glamor of missiles, but wouldn't it be against the best interests of the United States, in your opinion, if we began to believe that our only salvation lay in missiles and we forgot about manned bombers or manned units?

Mr. KINDELBERGER. I think it would be the greatest mistake we can make. I believe we will be using manned bombers for 15 years easily.

Senator SYMINGTON. Fifteen years?

Mr. KINDELBERGER. Yes, and maybe beyond that. I am sure we will be using them that long, and I think we will be using manned interceptors, too.

Senator SYMINGTON. And after 15 years we will be using manned missiles, won't we?

Mr. KINDELBERGER. You know, one of my managers was complaining because he was not building missiles, and he said, "After all, what is the difference between building an airplane of this complication and a missile?" And actually there is not very much, but where does it stop and where does it start?

We are talking about glide bombers that get up out of the atmosphere and bounce on the atmosphere. That is an old idea. We talked about that when you were in the Air Force. We are talking about it again.

SIMILARITY OF THE WEAPONS

We talk about manned satellites and we can do that easily with almost existing hardware, with the X-15. We have carried things to the point where I don't know whether we are talking about a bomber or a manned missile.

Senator SYMINGTON. I am glad to hear you say that. I think it is important to understand that, and nobody has brought it out before in these hearings.

Mr. KINDELBERGER. A bomber is sent out, and if he has made a mistake, the commander of SAC can call it back.

On the other hand, if you fire off a whole bunch of intercontinental atomic armed missiles and it is a mistake, and it can be, you have started a great big war and you cannot call them back.

That is a very important thing, too. The reaction time on these very fast bombers is not too bad, but a man going out with one of those has a much better chance than a man in a B-17 had in World War II, much better, against the best defense that I can see Russia putting up. And when he is out there, he can find whether his target is a mistake and choose another.

He can hit 2 or 3 targets. He can keep on going or come back, and he can report damage. The missile cannot do that. It can't think. It can only operate as you plan it.

Senator SYMINGTON. My time is up and I will wait until the next round, but I want to ask you one more question.

The sputnik did one thing: it pulled some of this lack of defense out from under the rug.

Mr. KINDELBERGER. That is right.

Senator SYMINGTON. So the people could see it.

Now we have got a supplemental that has come up here for money for the fiscal year 1958, and we also now have a fiscal year 1959 budget request.

In the supplemental there is not 1 cent for an airplane, not \$1 for any airplane of any kind, which does not seem to bear out your position with respect to the relative importance of missiles as against manned airplanes. In the fiscal year 1959 budget, despite the fact that bombers and fighters were cut very heavily in the calendar year 1957, there is not 1 replacement of 1 cut schedule.

Now if that is the plan from the standpoint of money, how do you coordinate that into your thinking about the importance of planes as against missiles?

AIRPLANES ARE BEING SHORTCHANGED

Mr. KINDELBERGER. Senator Symington, I am not the guy who coordinates that, and we are not asked about this very often, but I think that the bomber and the tanker and the missiles for the bomber, I mean the air-to-surface missile type thing, should receive a lot more, and I include an air-to-surface missile as part of a bomber today because it becomes part of a bomber. And yet the money that the Defense Department was allocated seemed to be stretched to the point where it is pretty thin. I have been trying to get on the trail of some loose money myself and I have not found any.

It will probably come in and there will probably be some changes and there will probably be some supplementary requests.

Senator SYMINGTON. Mr. Chairman, I think my time is up. I will wait for the next round.

Senator STENNIS. I will call on you for the next round.

Senator SYMINGTON. I appreciate that, Mr. Chairman. I will yield to counsel or to you.

Mr. WEISL. Go right ahead, Senator.

Senator SYMINGTON. Mr. Kindelberger, among other things you were noted for was the price at which you built them. As I remember it, you built planes for about 5 percent of what we pay for planes

today during production in World War II. We have heard discussions here about reprogramming. When you go from 143 wings to 137 to 127 to 105 now, as of a few days ago, and then back to the 110, this whole reprogramming picture is a pretty expensive way to handle things from the standpoint of good business practice, is it not?

Mr. KINDELBERGER. Oh, yes; every time you change, you change a great chain of things, particularly if it is an intricate airplane that is subcontracted all over the country, and if it is at any fast point in production, because you cannot slow it down without affecting every subcontract. It is not unusual for us to have 2,000 or 3,000 suppliers on a single airplane.

All of that has to change, too, you see, and some of the time you let it come in. You let it come in, you have to pay for it. Or, if it is being made at that rate, you have to pay for it until they can slow down. In the meantime, you go to the bank to get the money to give to them, so it does affect it very greatly. Any time you change a rate, and change it quickly, it is expensive.

THE OFF-AGAIN, ON-AGAIN PROCESS

Senator SYMINGTON. I never talked to you about this before, but it seems to me that we have a basic fallacy in our effort to arm ourselves. When Khrushchev smiles, we cut our program. When he cusses at us, we increase it. If he does something unusual, like sputnik, we increase it.

If, on the other hand, we do something pretty good, we may well decrease it.

Suppose, instead of operating on that basis, with this constant reprogramming—in which the Congress is partly at fault, but the primary fault lies in the Pentagon and its relationship with the Bureau of the Budget—suppose, instead of doing it that way, we just made one decision first; namely, what the danger is that faces us.

And then, second, we decided what we have to do to meet that danger, regardless of what it is.

And then, after those two points, we established a third; namely, we are going to get those things necessary in the quickest reasonable time, and program over a long period, relatively, instead of a short period. One, two, and three, what is the danger, what do we have to do to meet it, and how can we organize to do the most effective job?

With the premise of those three steps, would we not get, ultimately, whatever was necessary at far less money than we are spending today?

Mr. KINDELBERGER. I feel we would. I agree, too, with the fact that, if the Russian turns his head, we turn our head. I heard a rumor here a while ago that Russia would quit building bombers. A lot of people were saying we should quit building bombers, too. It was not true. They have not quit building bombers. But the rumor was that they were going to abandon them and have missiles. And I heard that is what we were going to do, and that is exactly what Khrushchev would love to have us do, I am sure.

Senator SYMINGTON. I think you are entirely right. Has anybody discussed with you the Navaho? I was not here all the time. We had a meeting of the Agriculture Committee today, and Mr. Benson

was up, so I had to be over there for a while. I missed some of your testimony. Have you discussed the Navaho at all?

Mr. KINDELBERGER. Well, the Navaho was started in 1950, when we decided we did not have enough information, enough knowledge, and the state of the art was such that we could not proceed with a ballistic missile at that time.

I hear people say, "Why didn't we get started way back? Why didn't we start in 1945 to build an intercontinental ballistic missile?"

We did start. The Atlas was conceived along around that time. But they could not make it. We were working on one; we couldn't make it, because they were talking about a warhead of 15,000 pounds and, believe me, if you put that on an Atlas, it won't go up today.

But the light warhead was not even imagined then, and it came on as a development, and made possible, with the increased engine efficiency, the operation of an Atlas-type missile. And we got into that about 1954. Again, in the meantime, Consolidated had carried it on themselves, and with our engines; we were producing them for the Navaho.

Now, the Navaho had been switched to an air breather, which means that it was boosted off with these big rocket engines. It separated in the air, dropped the booster and proceeded on ram jets at a very high speed and very high altitude, and, of course, carried a very large payload. We were in the last stage of it, and just starting to work on the testing of the second stage of it, when I was told that it was not programed, and the reason was they had no money.

Well, obviously, they had no money because it had been overspent. That is when everything was being chopped up. And it just happened that the Navaho had in it \$170 million unspent, which was for programs ahead, and I think that would have made an awfully nice bait to get that in, besides the fact that a number of people, lots of people—

Senator SYMINGTON. Excuse me. I want to be sure I understand you. They wanted to take back that \$170 million?

Mr. KINDELBERGER. Sure.

Senator SYMINGTON. For purely fiscal reasons?

NAVAHO TOOK OFF WITH 300,000-POUND THRUST

Mr. KINDELBERGER. Yes. That was part of it, and other people decided that the Navaho was obsolete.

I could build today, with engines I can foresee, a missile that would do the work of the Navaho, for 60,000-75,000 pounds, even lighter. The Navaho took off with 300,000 pounds. But that is because we are looking toward a new engine which we did not have then. And we aren't going to have it for years, either. But, in the meantime, we had the Navaho. We had it working. We had perfect guidance, one of the most beautiful you had ever seen. We had a production setup, everything was good.

But, of course, I naturally would feel badly about it being canceled, having worked right hard on it for 10 years and getting it right to that point. But the decision was made on account of lack of funds, plus a decision on the part of a lot of people that the ballistic missile would do the work of the Navaho.

Senator SYMINGTON. But the Navaho is responsible for all the propulsion systems in the Jupiter and the Thor and the Atlas?

Mr. KINDELBERGER. Right.

Senator SYMINGTON. Is it not?

Mr. KINDELBERGER. That is right.

Senator SYMINGTON. And there has been a lot of criticism, which must reflect a bit on your great company, about the cost of the cancellation. I have seen figures running as high as \$700 million. Now, suppose we had to start off today and initiate a program, we will say, like those on guidance and warheads for ballistic missiles; what do you think the cost would be to get the rocketdynes that you have developed, not only for the Navaho but also for those three ballistic missiles?

Mr. KINDELBERGER. Well, Senator Symington, you couldn't buy it in time. Now, time is the most expensive thing, when it is wasted, in the world. You cannot buy time back. You can buy anything you want with money except time, and you couldn't pay any price for an engine that didn't exist.

It happens that the amount spent on those engines in the Navaho has been fed into our fund of knowledge in the country. It has made the ballistic missile a possibility. And had we not built the Navaho, you would not have those big engines; and without the big engines, it follows you wouldn't have any missiles.

If you didn't have any missiles, God knows what we would do, because we just wouldn't have anything.

Senator SYMINGTON. One final question. Recently in one of the talks the President made after sputnik, he emphasized the value of the Snark.

Actually, the Navaho was nothing more or less than an improved Snark. It went many times faster and many thousand feet higher.

How can you correlate the, you might say, vaunted expression about the Snark at the same time you cancel out the Navaho? I could not figure that out.

Mr. KINDELBERGER. I would rather answer that another time rather than in open session.

Senator STENNIS. In executive session.

Mr. KINDELBERGER. Yes.

Senator STENNIS. Senator, we are going to have an executive session here.

Mr. KINDELBERGER. On the other hand, it is subsonic, it is an unmanned airplane.

Senator SYMINGTON. What, the Snark?

Mr. KINDELBERGER. The Snark.

Senator SYMINGTON. Sure. Everybody knows that. I do not see why you have to answer that in executive session.

Mr. KINDELBERGER. That was not the answer I was going to give you completely.

SAYS NAVAHO SHOULD NOT HAVE BEEN CANCELED

Senator SYMINGTON. Well, do you think the Navaho should have been canceled?

Mr. KINDELBERGER. What?

Senator SYMINGTON. Do you think the Navaho should have been canceled?

Mr. KINDELBERGER. No; I do not.

Senator SYMINGTON. Do you think it was a very desirable new weapon to be used in war?

Mr. KINDELBERGER. I certainly do.

Senator SYMINGTON. And the only reason it was canceled was because of money; was it not?

Mr. KINDELBERGER. Principally, yes. Well, I think if sputnik had happened 3 months later, they would never have canceled Navaho—3 months earlier.

Senator SYMINGTON. If it would be wrong to cancel it now, it was wrong to cancel it then; was it not?

Mr. KINDELBERGER. Yes. Yes, but they had no money, and we go around the circle, and that is what they said it was, lack of funds.

Senator SYMINGTON. Mr. Chairman, I will now await my turn.

Senator STENNIS. All right.

Mr. Counsel, do you have something?

Mr. WEISL. No, sir.

Senator STENNIS. Senator Symington.

Senator SYMINGTON. I notice something you said here which Mr. Lanphier also said. The committee feels we have not had a better witness than Mr. Lanphier, I am sure, and you say that he was the most pessimistic witness with respect to our missile program.

He thought that some of the figures that had been given us were, putting it mildly, on the optimistic side. And yet I see that in your prepared statement you think he was too optimistic about the missile program.

What do you base that on?

Mr. KINDELBERGER. Well, I have seen a lot of it, Senator Symington. I have talked to a lot of the people. I have lived close to this thing for a long while. And there are a lot of people in the missile area who think that it is done when it fires and goes off successfully once. And I know that Tom does not.

I have had conversations with him. I think that he is a little more optimistic than I am about the time when, as I said, you would have them standing there dependably and ready to go.

Senator SYMINGTON. Well, it is generally recognized and I am not passing out any empty compliments—that there is nobody who knows more about aeronautics than you do. Your opinion is very important to the American people today, because we read in the papers that we are going to shovel all these missile squadrons over to this country and to that country, like, you remember, in 1940, according to the French, we were going to have 50,000 planes over there in a couple of weeks.

Now, if we are basing our international commitments and obligations to our allies on overly optimistic dates with respect to when we are going to have operational missiles, we are going to have a pretty rough time in the next few years; aren't we?

ROUGH ROAD AHEAD FOR MISSILES

Mr. KINDELBERGER. Well, I think we will have a rough time with missiles for some years; yes. And it worries me, too, it worries me

greatly. It worries me to think that we are giving as much attention to outer space without looking down here where we are going to be working, too.

We are caught between the two things. I don't say that the missile is impossible. The missile is perfectly possible.

But as I said, we tested airplanes for hundreds of hours to get them to the degree of efficiency that we expect the missile to get when we have a few minutes of flight on them.

Senator SYMINGTON. Understand, I completely believe in missiles and missile development and I know you do, but I was talking primarily about the time involved.

All of a sudden it seems that we are going to have these missiles just the day after tomorrow when it has never worked out that way on an airplane. I went down to Cape Canaveral and watched the count downs and looked at them and saw some failures and I don't see how with an instrument that is not manned and that is so completely complicated, we are going to all of a sudden shorten all these lead times tremendously as compared with airplanes. I would say that we would both agree that the Vanguard episode somewhat justified our apprehension, did it not?

Mr. KINDELBERGER. It did mine.

Senator SYMINGTON. You remember what the weight of this satellite was that we were putting up?

Mr. KINDELBERGER. 18 pounds we were going to put up.

I think it was 18 pounds.

Senator SYMINGTON. I think it was $3\frac{1}{2}$ to $4\frac{1}{2}$, the one in December.

Mr. KINDELBERGER. Oh, that one; yes.

Senator SYMINGTON. In March we are going to 21.

Mr. KINDELBERGER. Yes, they called it the Grapefruit.

Senator SYMINGTON. Do you think there is any justification for thinking you can make a ballistic missile with propulsion guidance and reentry in an appreciably less lead time than you can an airplane?

Mr. KINDELBERGER. No.

Senator SYMINGTON. Mr. Chairman, I have no further questions.

Senator STENNIS. Thank you, Senator Symington.

Counsel, do you have any further questions in open session?

Mr. WEISL. Not in open session, Mr. Chairman.

Senator STENNIS. This witness has some testimony that will have to be taken in closed session. That is according to the legal requirements, because it is classified information that pertains to our security, so for that reason we will have to ask our visitors to kindly retire so that we may have an executive session.

(Whereupon, at 5:20 p. m. the committee proceeded in executive session.)

INQUIRY INTO SATELLITE AND MISSILE PROGRAMS

MONDAY, JANUARY 20, 1958

UNITED STATES SENATE,
PREPAREDNESS INVESTIGATING SUBCOMMITTEE
OF THE COMMITTEE ON ARMED SERVICES,
Washington, D. C.

The subcommittee met, pursuant to call, at 5 p. m., in room 212, Senate Office Building, Senator Stennis presiding.

Present: Senators Stennis and Symington.

Also present: Edwin L. Weisl, chief counsel; Cyrus R. Vance, counsel; Daniel F. McGillicuddy, associate counsel; and Stuart P. French, associate counsel.

PROCEEDINGS

Senator STENNIS. Next we will be in open hearing.

Let us have order, please.

We are having everybody testify under oath, if you do not mind.

Do you solemnly swear that your testimony will be the truth, the whole truth, and nothing but the truth, so help you God?

Major DE SEVERSKY. I do.

Senator STENNIS. All right, have a seat.

All right. Those who wish to stay, please find seats.

We are very glad, indeed, to have you here and were sorry that the hour is as late as it is but it just could not be avoided. You have a statement?

Major DE SEVERSKY. Yes, sir; I have.

Senator STENNIS. You may proceed.

TESTIMONY OF MAJ. ALEXANDER P. DeSEVERSKY, AERONAUTICAL CONSULTANT

Major DE SEVERSKY. Mr. Chairman and members of the committee, although I was summoned by your counsel on short notice and it is therefore physically impossible for me to submit to you a comprehensive memorandum, I am nonetheless grateful for this opportunity to present my views.

I shall confine my remarks primarily to those areas of the hearing where I find myself in disagreement with the testimony heretofore submitted.

Of necessity, my remarks will be brief. But I hope that the questions asked by your counsel and the members of the committee will bring out some of the details which are, in some cases, just as important as a broad assessment of the problem.

First, I would like to refer to the Defense Establishment.

1. *Defense Establishment*

(a) Rockefeller report: To me it is heartening that at last a public debate on our national defense is underway. I hope this debate will not be confined alone to Washington but will be joined in in every hamlet in the United States. Tactics and weapons are the province of the expert; but broad national policy in the area of security, like any national policy that affects the entire Nation, is the province of the people. It is primarily the product of logic and wisdom.

Furthermore, strategy cannot be kept secret. It is evident from the size and allocation of appropriations and from the country's industrial effort. A free society cannot win a war by deception or surprise. Our strength must be inherent, and obvious to all.

It is encouraging to me, therefore, that such a distinguished group of people, under the leadership of Mr. Rockefeller, has devoted its time and energy to analyzing the current defects in our military posture. However, I consider the group's findings merely an opinion, an important contribution to an overall debate.

To start with, the group's analysis of the deficiencies of our present Military Establishment is correct. It is identical, not only in scope but in some instances even in language, to my own analysis which was published 8 years ago in my book, *Air Power—Key to Survival*. A copy of this book was sent at the time to every Member of the Congress, and a copy of the relevant chapter, entitled "Our National Defense Establishment," is attached to my statement.

CRITICISM OF UNIFICATION ACT

Incidentally, the Rockefeller Committee is greatly concerned with our lead time in production of weapons, the lag between a concept and its reduction to operational status. I am more concerned with our intellectual lead time, which I am afraid is at the root of all our present trouble. Eight years ago I tried to warn the Congress and the people that the Unification Act of 1947, as amended in 1949, was, quote "neither fish, flesh, nor fowl, and will never project a single strategy for victory"; that we were, and I quote again, "proceeding to create three separate strategic forces, each demanding the largest possible share of our security potential—which amounts to a guaranty that none of them will attain the magnitude and concentration for victory"; that the act attempts "to perpetuate by law the strategy and tactics of World War II"; and that "we are opening ourselves to the confusion that existed at Pearl Harbor, only this time on a global scale and prescribed by law."

In other words, I warned that because of a fallacious setup there was a danger that our defense program would develop a disease that would threaten the very life of our Nation. Now 8 years later, when the disease has become malignant and apparent to all, the Rockefeller report belatedly explains how the malady was contracted. But instead of offering the bold and skillful surgery required to remove the growth and restore the patient to health and vigor, the commission prescribes a conglomeration of medicine-man potions that will only prolong the agony. The cure is even worse than the disease.

Under the beguiling claim that their proposal will achieve the right kind of military strength which is compatible with a healthy economy,

the commission offers the same strategy of proffigacy—of building everything and anything that comes to mind: the same old tired dish of defunct strategy of balanced forces, served to the Congress and to the people smothered in a new rich sauce of limited warfare.

In the short time available to me I naturally cannot go into a complete analysis of the Rockefeller report. But I hold myself in readiness to assist this committee in any way possible should they desire to analyze the report in detail.

In order to support my criticism, however, I find it necessary to allude to at least a few of the report's recommendations.

For example, it states that we have, "a superior industrial base and production know-how" which will "enable us to assign high priority to a greater variety of projects than the U. S. S. R."

This simply is not true. Whatever margin we may have in this respect is erased by the appalling disadvantages of geography and the dearth of American manpower. We cannot support a family of strategic plans. Whatever industrial capacity and manpower we possess, we must commit to a decisive force operating in a decisive medium.

We can afford only one strategic plan. Anything else is a product of compromise. And I have stated time and time again that in the formulation of a correct strategy "there can be no genuine compromise. The correct answer cannot be obtained by averaging opposing viewpoints, any more than surgeons, failing to agree on a diagnosis, can settle the issue by operating on some in-between part of the anatomy. A strategy is either right or wrong—and we can't risk being wrong."

QUALIFIED CONCURRENCE WITH RECOMMENDATION FOR UNIFIED COMMAND

The report's proposal that we organize our operational military force into unified commands makes sense. But the composition of some of the commands proposed is utterly unsound. As an example, I would like to refer to their recommendation that a limited war command be created.

This alone would demand the biggest Army, the biggest Navy, the biggest Air Force, the biggest Marine Corps, the biggest everything—a Defense Department in itself. It is bound to absorb such a huge portion of our national defense effort that it will forever preclude the maintenance of an adequate retaliatory force—our Strategic Air and Space Command.

As a part of this fallacious concept, the report recommends that the Army should be allowed to develop and operate transport aircraft in order to move its forces swiftly to the combat zone. To allow the Army to develop its own air transport is just as illogical as to allow the Army to develop its own sea transport and merchant marine. Such a recommendation is an intellectual regression in an attempt to turn back the clock of progress.

Every tyro knows that such transport can never reach the battle area unless its passage is guaranteed by air superiority. But such air superiority is tabooed by the limited minds of limited war advocates: We must not even attempt to achieve air superiority, they declare, since to do so we would have to hit the enemy's airpower at its source and that would provoke a total war.

Thus, in a limited warfare, they want us to fight an air war without air superiority; a surface war with inferior manpower without a chance of scoring a decision; and to lose our supporting Navy without even attempting to neutralize the source of attack. The whole thing is preposterous.

I want to put myself on record that the era of limited or so-called little wars, has come to an end until we take leave of our strategic defense. No man in his right mind could think a limited war can be won by us with conventional forces without the use of nuclear weapons. Yet the same unique state of today's military technology which makes total war idiotic makes a nuclear limited war idiotic also.

Further expansion of communism cannot be accomplished through overt aggression. The limited war advocates concede that our deterrent force is "useful in preventing or stifling limited wars," but they insist that we must not use it, that we must preserve it as a whole for total war. And then they proceed to recommend creation of a separate limited war command, instead of expanding our Strategic Air Command so that its size, flexibility, and nuclear power can nip any aggression in the bud and yet it can retain its overwhelming retaliatory power. Any further expansion of communism from now on can be accomplished only through covert aggression, which means subversion and infiltration by political and economic means.

CONTENDS LIMITED WARS DO NOT CHANGE STATUS QUO

Limited war, like total war, is self-defeating. In any case, it can be fought only with the consent of both the belligerents and is for that reason bound to end in a stalemate. No advantage, military or political, can be gained by such a war. At best these wars are a reconnaissance in force, useful to gain some knowledge of the enemy's capabilities and his political intentions, with the inevitable result of disclosing our own hand.

Korea and Suez are proof that limited wars will always end precisely where they started, the status quo prevailing, unless they explode into a major conflagration which, under the existing balance of nuclear terror, would mean the complete annihilation of both belligerents.

It is clear to me that Russia has already sensed this new power relation. That is why she desisted from further inciting Turkey and Syria against each other. Since then, she has further demobilized her conventional forces, diverting that manpower toward increasing her strength in total war and broadening her industrial capacity to forge the tools of economic war.

One more fallacy contained in the report will suffice:

According to the report, the services will continue to remain separate entities. The officers must develop the understanding, loyalty, and esprit de corps of their distinctive branch. But when, after 30 or 40 years of dedicated service, the Defense Department pins another star on their shoulders—presto! they become ambidextrous or even triphibious, utterly detached from their innermost convictions and philosophy, and instantaneously acquire a broad, overall view which supposedly transcends the service boundaries. This is a good psychic

trick if you can do it. That recommendation alone threatens to destroy totally the morale of our Armed Forces.

The fallacies of this report, I am convinced, stem from the fact that it represents a compromise on the uncompromising views of individual members of a large committee, where each member's opinions are influenced by so-called enlightened self-interest. I feel certain that each member of this distinguished body individually could offer much better and much more comprehensive recommendations.

I would like to go to the fundamentals of a new Defense Establishment.

(b) Fundamentals of a new Defense Establishment: In his state of the Union message, President Eisenhower, among other things, stated as follows, and I quote:

The advent of revolutionary new devices * * * creates new difficulties, reminiscent of those attending the advent of the airplane half a century ago. Some of the important new weapons which technology has produced do not fit into any existing service pattern. They cut across all services, involve all services, and transcend all services. * * * In some instances they defy classification according to branch of service.

I agree that the airplane did create new difficulties in the defense area half a century ago because it opened the space above the surface of the earth as the most efficient medium for carrying destruction to the enemy. The Air Force was created to exploit this third dimension, as another arm of our national defense. Since then, man has flown four times faster than a bullet, faster than a 16-inch shell, and faster than some ballistic missiles.

WOULD LIMIT SPACE JURISDICTION TO AIR FORCE

With rocket propulsion, the weapons of the Air Force no longer depend on the atmosphere for sustenance and propulsion. The sky is no longer the limit. The space above is the natural domain of the Air Force. And, since air power is space power, supersonic vehicles, missiles, and satellites do not revolutionize warfare. They are simply more efficient weapons of air and space power.

I am compelled to disagree with the President that these new weapons transcend all services. They logically belong to the Air Force, which has for years prepared itself to wield these new instruments of war. The Air Force is not wedded to aircraft. It is a tridimensional military force that has the organization and the skill to keep abreast of space technology.

Sheared of their former strategic significance, the elder services have tried to maintain their departments in their customary strategic splendor by attempting to leapfrog over the Air Force into space to acquire a new strategic role. The Navy maneuvered to take charge of the Vanguard project in order to be the first to stake a claim in space with a token 6-inch "moon." The Army developed its Jupiter-C, coveting the ambition of launching the first manned satellites and thus constricting the Air Force to the thin layer of the atmosphere.

In doing these things, the elder services are actually deserting their primary missions on land and sea. It is ridiculous that these forces are both trying to become space forces. How confusing it will be if the space around our planet is infested by silver sputniks of the Air Force, golden sputniks of the Navy, and khaki sputniks of the Army,

all orbiting around in uncoordinated motion in all directions, under the control of three different heads who refuse to speak the same language.

The present Defense Establishment is a product of World War II mentality. It presupposes that any future war will be fought with the same methods of balanced forces strategy that were used in the last conflict. The Unification Act freezes for all time the roles and missions performed by our Armed Forces in the last war. To brand the military services' rivalry "disgraceful" as Dr. Vannevar Bush did recently before your committee, is certainly ungenerous toward the military men involved.

The fact is that each of them is patriotically defending his inner-most convictions. Right or wrong, some of them deeply believe in every fallacy they preach. What is disgraceful is that we still keep on the books the defense law which leaves military men no choice but to bicker and compromise on the questions that involve our very survival.

PICTURE OF THE FORM A FUTURE WAR WILL TAKE

In any future war, no military force will be able to survive on the surface of the earth. The Army will have to go underground, the Air Force will have to remain airborne, and the Navy will have to go underwater. It would end down below anyway in case of hostilities, so why not plan it that way in advance to obtain maximum strategic capability? All these forces will be able to return to the surface of the earth only after the question of who controls the air and space above has been resolved. And that decision will be gained by the Air Force, wielding a well-coordinated and perfectly timed offense with planes, missiles, and satellites.

Eight years ago I recommended that "we have 1 genuinely integrated department of 1 military force in conformity with 1 definite strategy," and that "when the people, having weighed all the pertinent facts, decide what the strategy shall be," the innocuous position of chairman of the Joint Chiefs of Staff shall be replaced by that of "a military chief vested with power of decision" to carry out that basic strategy.

"Then," I wrote, "genuine integration, singleness of purpose, and unity of command will be achieved." Today I am more than ever convinced that I am right.

The outcries that such a direct line of authority, when the chief of a single staff makes the necessary decisions, smacks of totalitarianism and creates a military Solomon, as Admiral Burke lamented, are utterly unwarranted. Such an organization in a totalitarian state, under the direct orders of a dictator, is one thing; the same organization, working under the President, the Secretary of Defense, and control of the Congress, is quite another. To deny that in a democracy a single man can have authority and responsibility is to invite anarchy—and that is exactly what we have witnessed in our national defense during the past 10 years.

The inexorable progress of technology has already made our Navy about 90 percent air force. It wants to project its power through the air and space above by planes and missiles. The Army likewise

clamors for its own independent aviation service in order to project its power through the air and space above with planes and missiles.

It is ridiculous for three separate agencies to fight the same air war with the same weapons; namely, planes, missiles, supersonic manned vehicles or satellites. The time is long overdue for us to integrate our 3 services into 1 single military force, with 1 uniform, 1 promotion list, and a single staff.

The new establishment must be, for all practical purposes, a congenial Department of the Air and Space, in which we have a Bureau of Ships, a Bureau of Ground Forces, and bureaus of other auxiliary units.

The changes that I propose cannot come from the Pentagon. Even though some of our top military leaders individually see their wisdom and timeliness, as a group they are entirely too regimented under the present setup to make such recommendations with impunity.

There is only one source from which the necessary changes can come, and that is the American people, bringing pressure on their representatives in Congress. But they cannot act unless they are brought to realize the dangers inherent in our present military system. The present national debate on the subject of our defense and foreign policy is the only road to survival.

The President, in his state of the Union speech, promised in the near future to recommend some definite plans for the reorganization of our Military Establishment. But I must submit that the recent actions of the administration, in my opinion, only add to the confusion. The very fact that we are now compelled to appoint a number of czars and pile one superofficial on top of another proves that there is something wrong with our approach to the problem.

NEED SEEN FOR DEFINITION OF MISSILES JURISDICTION

The presence of Dr. Killian in the White House is all to the good. It will enable the President to be correctly informed in scientific matters. But unfortunately there has been no clear-cut definition of the relationship among Dr. Killian, Secretary of Defense McElroy, and Mr. Holaday, Assistant Secretary in charge of missiles, whose powers have been elevated and made equal to those of the Secretary of Defense himself.

The situation is further complicated by the statement that if a new important weapon is conceived, another powerful executive with extraordinary authority will be appointed to handle it. We had difficulties with 3 separate services headed by 1 Secretary of Defense. How confusing it will be with three services working under half a dozen of what amount to equally powerful Secretaries.

The creation of an Advance Research Project Agency will not solve the problem. The latest move to split antimissile defense between the Army and the Air Force defies comprehension. The Air Force is already vested with the air defense of our country. General Partridge, an airman, is commander in chief of overall continental defense.

Regardless whether a ballistic missile is viewed as a supersonic vehicle of the Air Force or simply as long-range artillery, the fact remains that all these vehicles—ballistic or guided, manned or unmanned, whether for offense or defense—operate in the selfsame

space. The air ocean and its endless outer space extension are one and indivisible, and should be controlled by a single, homogeneous force—and that, as I have already stated, is the Air Force.

Instead of fragmenting our effort, General Medaris and the Redstone Arsenal must be bodily, with all personnel, transferred to the Air Force, or at least the Air Force must have complete operational control over that establishment. Once this is done and a single agency is vested with responsibility, it must be left alone. The fewer czars, the fewer coordinators, the faster we will get along with the job.

More money for defense alone is not enough. The whole approach, the whole philosophy, to our national defense must be changed if we are to regain our military superiority.

2. *Active air defense in total war*

Throughout history, the advent of each new weapon seemed at first to provide an unimpeded offensive means for its possessor. But eventually and inevitably an appropriate defense was developed, and the offense-defense balance was restored.

The nuclear warhead is no exception. Its devastating power will ultimately be balanced by the difficulty of its delivery to the target. Each war differs radically from the preceding conflict. World War I was static, characterized by trench warfare. World War II, on the other hand, with its motorized equipment and air power, was highly dynamic and mobile.

QUALITY OF OFFENSE CAPABILITY PUTS PREMIUM ON DEFENSE

The next war will differ from the last by again becoming static, a paradox in view of the fact that it will be fought at hypersonic speeds. The strategic picture will be not unlike that of two immobile fortresses, shooting it out with long-range weapons.

With the ballistic missile a reality, the maximum in offensive power has been reached. Everything else is anticlimactic because the time element of attack has increased. It is only natural, therefore, that the scientific energies and resources of the protagonists will be channeled automatically into the defensive effort. The present atomic stalemate is bound to evolve into the centuries-old balance of power, when the destruction of the military force of one side can be accomplished only through a protracted attrition inflicted on the enemy by the forces of the other side. When the offensive capability of the belligerents are equal, the defense becomes decisive.

In developing this defensive capacity, I maintain that we must be guided by several fundamental assumptions:

First, we must recognize that speed per se is no longer a defensive feature of offense. No matter how fast a missile streaks through the air of space, it can be stopped. Stop the means of delivery, and what it carries no longer matters.

The second fundamental to recognize is that in a short time the range of detection of airborne vehicles by various scientific means will expand throughout the entire circumference of the globe. The surprise attack will be impossible, unless one side is fast asleep. Thus penetration will depend, not on speed and not on surprise, but on the ability to countermeasure the energy impulses of the defense.

Once we reach that stage, it will be not a physiological or technological, but purely tactical decision whether a robot or a human mind must guide the vehicle. In general, robots are too logical. Their reaction is predictable; they are easier to intercept. It will take human intuition and power of choice to baffle and outwit the defense. That is why I am convinced that, for any predictable time, the hypersonic, manned vehicle will be the decisive weapon in any future war.

It is true that a robot can be perfected to duplicate the reactions of the human brain. But such a device will be enormously complicated and costly. That is why I maintain that true pushbutton war, though a scientific possibility, is an economic absurdity.

In summing up, it is clear that our country is uniquely equipped for this kind of warfare. I have always been convinced of this.

OUR COMMUNICATIONS SYSTEM GIVES US AN ADVANTAGE

Although Russia has made vast technological advances, its standard of living has not improved appreciably. On the other hand, the United States has greatly expanded its telephone, telegraph, ticker-tape, teletype, and microwave facilities—to mention only a few. This highly efficient communications web—the indispensable ingredient of an effective defense complex—is already in existence.

Representing hundreds of billions in investment, it is the product of our free enterprise and industrial civilization. It would be a gargantuan task for any government, no matter how autocratic, to create a similar complex, even with slave labor, and have it operational by the time of maximum danger 3 years from now.

Don't misunderstand me. I do not advocate an electronic Maginot Line, nor do I advocate defensive strategy, because the military principle that only offense can win a war is as true today as it has been through the ages.

What I am trying to clarify is that modern defense consists of combat interception by planes, missiles, and nuclear warheads the moment the enemy is airborne 5,000 miles away. It is a continuous electronic battle. Likewise, the offense will have to fight its way to the target the moment it is airborne for attack. Both offense and defense are an integral part of the overall battle for command of the air, the space above, and the electronic right of way.

3. *NATO*

To consider NATO as a shield force for the free world is militarily unsound. It is still a trip wire, a mustard plaster applied to the Russian Bear's anatomy. Its only value is to divide Russian military potential so the Soviets cannot concentrate their entire resources on the destruction of America.

Russia has been in production of IRBM's for nearly 2 years. These are already operational, and she has them in great quantity. Every base and every strategic point in the NATO anatomy is already zeroed by these missiles and could be wiped out instantaneously and simultaneously. Therefore, NATO's survival is guaranteed only by the deterrent power of our Strategic Air Command, our sword of Damocles.

The true shield, therefore, is not NATO but the United States continental air defense, which makes it difficult for the enemy to destroy our vitality and our capacity to unsheath the sword. The Western Allies must understand that anything that weakens our shield and blunts our sword must be ruled out. If the NATO forces are maintained at our own expense, we are compelled to divide our overall potential just as much as Russia, and, because of our geographical disadvantage and our limited manpower, such a division could prove fatal.

CALLS FOR SELF-SUFFICIENT NATO

If NATO is to contribute to the strength of the free world, it must generate its own forces and weapons primarily by its own effort. Only then can the Western Alliance achieve superiority over the Communist bloc. The notion that we make ourselves stronger by expanding the balanced forces of our allies as a part of overall western strength for total war is a fallacy. An alliance built on such premises is no longer tenable.

The reluctance of the NATO countries to accept our intermediate range ballistic missiles is understandable to me. The new sword of Damocles, the American intercontinental ballistic missile, must be in being and operational before we dare to put IRBM's on European soil.

4. *Submarines*

I recognize a submarine firing a ballistic missile as a very potent weapon. But to endeavor to match the number of Russian submarines is not necessarily logical. This force must be developed in accordance with our own strategic requirements. We must not forget that Russia's industrial complex is deep within its land mass; whereas ours, and that of our allies, is deployed along the shoreline. It has been estimated that as much as 80 percent of our industrial capacity, therefore, is within reach of Russian submarines.

Basically, any expansion in efficiency of submarine warfare favors the enemy, not us. Therefore, I feel that we must exert our utmost scientific effort to solve the problem of detection and surveillance of these submergibles. We must endeavor to achieve a scientific breakthrough, and make water transparent, figuratively speaking. Deprived of its natural concealment, the submarine will become a helpless target of airpower. Thus the best way to deal with this Russian menace is to nullify the gigantic effort which the U. S. S. R. is devoting to this form of attack.

5. *Budget*

The proposed national defense budget for fiscal year 1959 is a break-away from the division of military appropriations more or less equally among the three sister services. I want only to bring to the attention of this committee the fact that the Air Force and the Navy are receiving identical amounts of \$18,008,000,000. Unless this is a fantastic coincidence, bordering on the miraculous, such equal division of funds represents a jurisdictional agreement and cannot possibly be a product of realistic strategic requirements. Apparently, it is the Navy's price to agree to cut the Army down to size, and I do not blame General Gavin for getting hot under the collar.

6. *Aircraft carriers*

I am of the opinion that the super aircraft carriers designed for strategic attack upon the mainland of the U. S. S. R. are an unnecessary drain on our economy. I have dealt with this question on many occasions, and my views in this respect are well known.

AIRCRAFT CARRIER CHARACTERIZED AS FEEBLE COMPETITION OF SAC

I would simply like to add that the transformation of a conventionally propelled surface Navy into an atomic Navy, though a technological improvement and progress, has no strategic significance. The new 80,000-ton giant-economy-size atomic aircraft carrier will be sunk just as swiftly as its smaller version if it ventures within striking range of enemy airpower which, by the time of its commission, will be global. This surface Navy, designed to project our air and missile power via slow-moving, manmade, floating islands is nothing but a costly yet feeble attempt to compete with the Strategic Air Command's direct and swift intercontinental capability. Yet this senseless, purely jurisdictional dispute absorbs a vital portion of our creative minds and scientific effort. Like the battleships at Pearl Harbor, these new ships of the line will be at the bottom of the ocean before they know they are at war.

One of our Strategic Air Command bases today contains, on the average, 45 strategic bombers. Equipped with 2 nuclear weapons each, the planes of this 1 base alone can deliver a damaging blow to our potential enemy. Suppose the commander of this base were to go before Congress and ask for \$5 billion for its defense. He probably would be sent to Walter Reed Hospital for mental examination. Yet the Navy builds a floating base that can launch only a handful of aircraft and missiles that are inadequate to defend their own task force, much less to attack the Eurasian land mass against fantastic odds; and then proceeds to spend \$5 billion for the protection of this floating base by a task force.

I recommend that the entire concept of strategic aircraft carriers be thoroughly reappraised by our Congress before any more money is appropriated for them.

7. *Strategic Air Command*

While fundamental changes in our national defense are being debated in the Congress, we must recognize that, in any future war, the decision will be scored only by our retaliatory striking force. Therefore, all offensive forces in being, of air, land, and sea, which employ planes and missiles as weapons systems, must be put immediately under the operational control of the commander in chief of the Strategic Air Command.

In view of the rapid increase in the electronic defense capability of the U. S. S. R., with the corresponding increase in the rate of attrition on our offensive forces, the size of our Strategic Air Command should be quadrupled. The production of intercontinental bombers must become a 7-day, 3-shift operation until such time as the B-52 and the B-58 are superseded by newer types.

8. *Civil defense*

The recommendations for civil defense contained in the Rockefeller report are almost identical in scope and language to those made in my book *Airpower—Key to Survival* in the chapter entitled "Defense in the Atomic Age." Therefore, I do not think it is necessary for me to take the committee's time to go into the matter in detail.

VETO OF AIR FORCE ASTRONAUTICS DEPARTMENT VIEWED AS MISTAKE

9. *Satellite and space projects*

On December 11, 1957, the Air Force established a Directorate of Astronautics for the purpose of handling such projects as earth satellites, space reconnaissance, space platforms, and other related projects. The establishment of this Directorate was promptly vetoed by Under Secretary of Defense Donald Quarles. My supposition is that the underlying reason for this action was the reconciliation of similar programs by the Army and the Navy.

As a compromise, a special agency is now being proposed for the Defense Department so that these projects can be handled outside the services.

I consider this extremely unfortunate. It will only complicate and retard the exploitation of space for our national security. I must repeat that space is the domain of the Air Force, which should be given the necessary funds and the authority to proceed and then left alone to do the job. This would be the fastest way to accomplish this important objective.

Conclusion

In conclusion I would like to state that, to those who cannot, or refuse to, see the necessity of a drastic change in our military setup, the current demands of the military seem impossible to satisfy. As a result, there is a tendency to emulate totalitarian practices in various degrees. Thus, Secretary of State Dulles recommended that we ought to "give up some of our marginal freedoms." I am convinced that he is wrong.

To me, it has long been crystal clear that in any modern human conflict, when one nation's total physical and human resources are pitched against another's, the entire populace can act in unison only under the compulsion of total regimentation or under the inspiration of total freedom. Our Nation's trouble today is that we find ourselves half regimented and half free, since, among other things, freedom means the right of the people to have access to the facts.

There are certain panicky souls who chide the American people for extravagant living, for riding in two-toned convertibles. Others recommend that we tighten our belts and reduce our standard of living. These are also dangerous notions. We have no right to demand sacrifices from our people as long as our military effort is only about 50 percent efficient.

We can never demonstrate to the world the superiority of our free society unless we can prove our ability to be invincibly strong and yet maintain the high standard of living from which our very strength flows. If, in the order to match Russian strength, we have to reduce the American mode of living to that of the Russian peasant or Chinese coolie, we will have nothing to offer.

CALLS FOR BREAK WITH TRADITION

We are still the greatest industrial nation on earth. With 650,000 scientists and engineers in our midst, we still have a greater creative brainpower pool than the Russians.

But we can never achieve our national aims unless we get rid of all the forces that have no longer a legitimate mission, and are only kept through inertia, sentiment, or tradition. I respect and admire tradition. I value the importance of esprit de corps. But when these fine heritages interfere with human progress and threaten our very security, I feel that we must have the moral courage to relegate them to the nostalgic past and to make the necessary fundamental changes in our military setup. The question is whether we will have the wisdom to make that move now, as a product of logic, or whether it will be forced upon us by the march of events, in which case the change may come too late.

Senator STENNIS. Major we certainly thank you.

Mr. WEISL, do you have some questions?

Mr. WEISL. I just have one or two. You have certainly given us a lot to think about at one time. I would like to make the record clear, Major Seversky, that the Vanguard was not demanded by the Navy. It came to the Navy as a result of the International Geophysical Year, which took away from the military the launching of the satellite.

Major DE SEVERSKY. I thought it was a logical move for the simple reason the Air Force is really the service that is supposed to handle the things. There is no reason for a service to develop projects which actually they are not—

Mr. WEISL. Just because they had the research laboratory, they were assigned the job. They did not demand it.

You were a major in the Russian Air Force?

Major DE SEVERSKY. No; a major in the United States Air Force.

Mr. WEISL. But you served in the Russian Army?

Major DE SEVERSKY. I was a commander in imperial naval aviation.

Mr. WEISL. Did they have a single chief of staff in the Russian military services?

Major DE SEVERSKY. At that time?

Mr. WEISL. At that time.

Major DE SEVERSKY. Well, the Czar, of course, was the commander in chief, and naturally he was the single chief of staff. The emperors always were military men. They graduated from military academies and war colleges, and also the Secretary of Defense, of army and the navy were all military men, so that is a little bit different.

IN RUSSIA THE ARMY OWNS EVERYTHING

Mr. WEISL. Yes. Do they now have a single chief of staff in the Russian military forces?

Major DE SEVERSKY. In effect. In Russia the army owns everything. The Secretary of Defense is an army man. He is the main boss. Everything is more or less subjugated to a single plan. That doesn't mean that we have to emulate the Russians.

Mr. WEISL. No; I do not say that.

Major DE SEVERSKY. I think we ought to go a little bit beyond what they have.

Mr. WEISL. They have civilian commissars attached to the army; do they not?

Major DE SEVERSKY. They do.

Senator STENNIS. Major, I am sorry and Senator Bridges is sorry that he could not be here. He suggested your name originally as one of the witnesses. He was here during the first part of the day.

Major DE SEVERSKY. That is all right. I want to get this off my chest. You gave me this opportunity.

Senator STENNIS. He wanted to express his regrets. You understand we have a system here that your statement will be called to the attention of all the members of the committee and also a synopsis of it by the staff will be prepared.

I am mighty glad I got to hear you direct, and I am going to look over some phases of your statement, too.

Major DE SEVERSKY. Thank you very much.

Senator STENNIS. We are very glad indeed to have had you here and want to especially thank you.

Mr. Vance, do you have anything else now? I believe this is the last witness, too, for today.

Mr. VANCE. Yes, Mr. Chairman.

If the chairman pleases, we would like to put Admiral Raborn's answers to certain written questions in the classified record.

Senator STENNIS. All right, Mr. Reporter, Admiral Raborn's answers will be put in the classified record.

Did you have any other points now?

Major DE SEVERSKY. No, sir.

Senator STENNIS. We are very glad to have had you here. I think you have added substantially to our record.

(Whereupon, at 6:25 p. m., the committee recessed, to reconvene at 10:30 a. m., Tuesday, January 21, 1958.)

INQUIRY INTO SATELLITE AND MISSILE PROGRAMS

TUESDAY, JANUARY 21, 1958

UNITED STATES SENATE,
PREPAREDNESS INVESTIGATING SUBCOMMITTEE
OF THE COMMITTEE ON ARMED SERVICES,
Washington, D. C.

The subcommittee met, pursuant to recess, at 10 a. m., in room 457 Senate Office Building, Senator Lyndon Johnson presiding.

Present: Senators Johnson (presiding), Symington, and Flanders.

Also present: Senators Smith (Maine) and Bush.

Edwin L. Weisl, chief counsel; Cyrus R. Vance, counsel; Daniel F. McGillicuddy, associate counsel; Stuart P. French, associate counsel; and Edward C. Welsh, staff adviser.

Senator JOHNSON. The committee will come to order.

I will announce for the edification of the members that it may be necessary for us to run past 12 o'clock today. If it is necessary we will do that. We do not have a session of the Senate until Thursday. Therefore, we do not have to be on the floor at noon.

Our first witness this morning is Adm. Chester Nimitz.

Admiral Nimitz, would you come forward please and as is customary with this committee, we will administer the oath.

Will you raise your right hand? Do you solemnly swear that the testimony you will give this committee will be the truth, the whole truth?

Admiral NIMITZ. I do.

Senator JOHNSON. Be seated, Admiral Nimitz.

Admiral Nimitz, it is a great pleasure to have you with us today. For me, it is a deep personal pleasure, because you and your family for many years have been associated with my neighboring town of Fredericksburg, Tex.

Long before the country as a whole had discovered the merits of Admiral Nimitz, we in the Central Hill country of Texas regarded the name as a very famous one. Our judgment was borne out when you assumed command in the Pacific in the most critical moments of World War II, and helped to lead our country to a great victory.

There is no point in gilding a lily. Your name is a household word throughout the world.

In order to show your qualifications in the record, I am asking unanimous consent of the committee to insert at this point a biography that the staff has prepared. Without objection the biography of Fleet Adm. Chester W. Nimitz, United States Navy, will be inserted at this point in the record.

(The biography of Admiral Nimitz is as follows:)

FLEET ADM. CHESTER W. NIMITZ, UNITED STATES NAVY

Admiral Nimitz was born in Fredericksburg, Tex., on February 24, 1885. He was graduated with distinction in January 1905 from the United States Naval Academy.

He held many important assignments until 1939 when he was appointed Chief of the Bureau of Navigation. On December 17, 1941, he was ordered to duty as commander in chief, Pacific Fleet, with the rank of admiral, effective from December 31, when he assumed that command. He was presented the Distinguished Service Medal by the President, awarded in the name of Congress, with the following citation:

"For exceptionally meritorious service to the Government of the United States in a duty of great responsibility as commander in chief of the Pacific Fleet since December 31, 1941. At the most critical period of the present war in the Pacific, he assumed command in that area and, despite the losses at Pearl Harbor and the tragic shortage of vessels, planes, and supplies, organized his forces and carried on defensive warfare which halted the Japanese advance. As rapidly as ships, personnel, and material became available, he shifted from defensive to offensive warfare and, by his brilliant leadership and outstanding skill as a strategist, enabled the units under his command to defeat the enemy in the Coral Sea, off Midway, and in the Solomon Islands; and to capture and occupy the Gilbert and Marshall Islands * * *

He was also awarded the Distinguished Service Medal by the Navy Department, for "Exceptionally meritorious service as commander in chief, United States Pacific Fleet. * * * The citation states that "His conduct of the operations of the Pacific Fleet, resulting in successful actions against the enemy in the Coral Sea, May 1942, and off Midway Island, June 1942, was characterized by unflinching judgment and sound decision, completed with skill and vigor * * *

On October 7, 1943, he was redesignated commander in chief, Pacific Fleet and Pacific Ocean areas. By act of Congress, approved December 14, 1944, the grade of fleet admiral of the United States Navy—the highest grade in the Navy—was established for certain officers of the active list, and the next day the President of the United States nominated and, with the advice and consent of the Senate, appointed Admiral Nimitz to that rank. He accepted the appointment and took the oath of office on December 19, 1944.

On September 1, 1954 (Washington, D. C., time), Fleet Admiral Nimitz was one of the signers of the United States when Japan formally signed the surrender terms aboard the battleship *Missouri* in Tokyo Bay.

On October 5, 1945, which had been officially designated as "Nimitz Day" in Washington, D. C., Admiral Nimitz was personally presented a Gold Star in lieu of the third Distinguished Service Medal by the President of the United States "For exceptionally meritorious service as commander in chief, United States Pacific Fleet and Pacific Ocean areas, from June 1944 to August 1945 * * *

On December 15, 1945, he relieved Fleet Adm. Ernest J. King, United States Navy, as Chief of Naval Operations.

On January 1, 1948, he reported as special assistant to the Secretary of the Navy in the Western Sea Frontier, and served in an advisory capacity, assisting in other matters pertaining to the Navy when called upon to do so.

On March 23, 1949, the Secretary of State announced the nomination, by the United Nations Secretary-General, of Fleet Admiral Nimitz—as Plebiscite Administrator for Kashmir, the dominions of India and Pakistan having both previously agreed to the plebiscite. Admiral Nimitz assumed the task as an international public servant of the United Nations, and not as a representative of the United States Government.

In January 1951 he was selected to head the President's proposed Internal Security Commission, consisting of nine prominent citizens under his chairmanship.

He has received numerous decorations for his outstanding service including the Distinguished Service Medal awarded by Congress, the Distinguished Service Medal with two Gold Stars in lieu of similar awards, and the Army Distinguished Service Medal.

Senator JOHNSON. As is customary, the counsel will proceed to examine you for 20 minutes and then each member of the committee, in turn, will question you.

Counsel Weisl, will you proceed with the examination of this witness?

Mr. WEISL. Yes, Mr. Chairman.

**TESTIMONY OF ADM. CHESTER W. NIMITZ, FORMER CHIEF OF
NAVAL OPERATIONS, UNITED STATES NAVY**

Admiral NIMITZ. May I thank you, Mr. Chairman, for your kind words of greeting and welcome.

Senator JOHNSON. Thank you, Admiral.

Admiral NIMITZ. It is a privilege to be here.

Senator JOHNSON. Thank you.

Mr. WEISL. Admiral Nimitz, after your magnificent record in World War II you served in the Pentagon; is that correct?

Admiral NIMITZ. Not in the Pentagon. I was still one of the old-timers who served in the old Navy Department building on Constitution Avenue.

I became Chief of Naval Operations on the 15th of December 1945, and remained for precisely 2 years as Chief of Naval Operations, and was relieved of that duty on the 15th of December 1947.

My 2 years are nearly 10 years back in history. The military posture of our country at that time was one of demobilization. We had just come through this war. We had acquired tremendous forces. We were set on a general plan for demobilization, and my principal activity for the 2 years that I was Chief of Naval Operations was to demobilize the Navy in an orderly manner without losing our ability to act offensively, if need be.

So I recommend that the committee in weighing the answers that I may give, remember that they are based on experience some 10 years old, but I have endeavored to keep myself informed of what has gone on in the Defense Department in a general way through the press and with a short period of duty a few years ago, as a consultant to the Nelson Rockefeller Committee which made a report to the President regarding a reorganization plan called No. 6.

HE IS NOW OPPOSED TO HAVING A SINGLE CHIEF

Mr. WEISL. During the war, or shortly thereafter, did you make any recommendations as to a change or changes in the Joint Chiefs of Staff?

Admiral NIMITZ. During the war the Joint Chiefs of Staff operated without statutory authority. It was an agency set up by the President as Commander in Chief of the Armed Forces to advise him. The Joint Chiefs of Staff consisted at that time of the Chief of Naval Operations, the Chief of Staff of the Army, the Chief of the Air Corps, United States Army, and Admiral Leahy, who served as Chief of Staff for President Roosevelt—and after the latter's death, for President Truman.

The Chief of Staff to the President acted as chairman for the Joint Chiefs of Staff.

During the war, while I was waiting for decisions, military decisions, in the field, I sometimes had a sense of frustration, and I think it only fair to inform this committee that at one time I agreed with the idea that we would do better with a single source of decision in Washington, which, of course, meant a single Chief of Staff.

My subsequent experience during the war and certainly my experience in Washington afterward, with more hindsight convinced me I was wrong, and I am now opposed to that concept.

Mr. WEISL. Admiral Nimitz, based upon all your experience up to date, do you care to give this committee any recommendation as to changes in the system of the Joint Chiefs of Staff and the chairman of the Joint Chiefs of Staff?

Admiral NIMITZ. During my 2 years as the Chief of Naval Operations, I felt that the duties of the chairman could very well be performed by one of the Chiefs of service, and that each Chief of service should rotate in that position, acting as the chairman and the spokesman for the Joint Chiefs.

I still believe that such a change is feasible and desirable, and I urge this committee to make inquiry of the people who now occupy those positions as to whether they feel they could carry on the duty as the Chief of their service, serve as a member of the Joint Chiefs of Staff, and for periods of whatever is determined appropriate period of rotation, act as the chairman and spokesman for the committee.

I personally believe that it can be done. I think if a Chief of service has a proper organization in his own service, where his deputy can carry on routine matters and the matters on which policy is well understood and well fixed, he can serve also as Chairman.

And here is the advantage that I would expect to come from such procedure. I regard the Secretary of Defense as the alter ego of the President. I, as Chief of Naval Operations, together with the then Chief of Staff of the Army, now President Eisenhower, sat in on the debate and discussion leading to the passage of the National Security Act of 1947. I believe that there should be the closest contact between the constitutional Commander in Chief, who is the President of the United States, and the Chief of each service.

Therefore, if each Chief of service in turn can appear before the President as Chairman and become well known to the President, in time the President will know his Chiefs of Staff and can evaluate their recommendations.

All of these men have come up through their services, each one can be expected to present the case of the other services or, bring along the dissident member. So I think it is worthy of investigation as to whether we can remove one layer in this pyramid, this chain of command, by having each Chief in turn act as the spokesman for the Joint Chiefs of Staff.

Mr. WEISL. And you believe that this committee should look into the problem of abolishing the present system of a Chairman of the Joint Chiefs of Staff?

Admiral NIMITZ. I do not think it needs abolition. Just say that instead of appointing a single or a separate Chairman, use one of the service Chiefs as the Chairman.

Now, as I told you; my experience dates back 10 years. Maybe there was less to do when I was Chief of Naval Operations. Maybe

these people are worked harder than they were when I was there. But I think each one in turn should be requested to give his views. I think it would be very helpful to the Secretary of Defense and to the Commander in Chief, if he could come face to face with each Chief of service every so often and receive from his own lips the recommendations or the message that is being transmitted.

Mr. WEISL. Who would decide the policy for the Nation after those recommendations were submitted by each Chief?

Admiral NIMITZ. Well, of course, I think we have to go back to the Constitution. The Constitution imposes upon the President of the United States the duty of Commander in Chief of the Armed Forces of the United States. And no matter how many people between him and the man in the field who eventually carries out tactical orders, no matter how many people are in between, the President has to make the decision. It is his responsibility. He can delegate the authority but he cannot delegate responsibility. The responsibility remains with the President.

Likewise, the Constitution imposes on the Congress the responsibility for maintaining armed forces, and that cannot be evaded. It is up to the services to make known their needs through appropriate channels and the Congress then decides what it shall do about it.

CHIEFS OF STAFF IMPLEMENT NATIONAL POLICY

I think that your question also implied how do the Joint Chiefs of Staff get together to make a plan.

Well, first of all, the planning of the Joint Chiefs of Staff depends entirely on the national policies of the country. What is our posture toward each country that might be an enemy? That posture is determined jointly by the President of the United States and the Congress.

Once that policy is determined, and is transmitted from the President through his various agencies, the National Security Council or the Secretary of Defense, it reaches the Chiefs of Staff and then they estimate the capacities of this country and what are our capacities to make out will prevail. Then we begin planning.

Mr. WEISL. Who finally decides what these plans should be after these recommendations are made?

Admiral NIMITZ. The Commander in Chief, the President of the United States.

Mr. WEISL. Admiral Nimitz, you served as consultant to the Rockefeller Committee, as you pointed out, which formulated Reorganization Plan No. 6, and this Committee recommended the creation of the additional Assistant Secretaries of Defense.

In the light of what you now know, do you believe that was a wise recommendation?

Admiral NIMITZ. When the Rockefeller Committee was sitting the situation was similar to the one in which we are now. A new Secretary of Defense was just taking over his office. He was recognized as a great industrialist, presumably a fine organizer, and when he asked for additional help—

Senator JOHNSON. You are referring to Secretary Wilson?

Admiral NIMITZ. I refer to Secretary of Defense Wilson.

I felt that the Secretary of Defense should be entitled to have the help he thought he needed. I was not foresighted enough and far-seeing enough to realize that if those assistants were made Assistant Secretaries of Defense, they would have a different status than if they were made special assistants to the Secretary of Defense.

It is my belief and my understanding of what I read about delays in going through the various layers of veto power in the Pentagon that too many people have the veto.

In other words, I think that it would have been a better arrangement had those specially qualified civilians and assistants been given to the Secretary of Defense as special assistants with only such power of influencing decisions as was their influence over the Secretary of Defense. That they, of themselves, should not be in the chain of administrative control.

INADEQUACY OF AVERAGE OFFICER IN BASIC RESEARCH

Mr. WEISL. Admiral Nimitz, in view of your long experience during the war, your experience as a regent of a great university since the war and your many other activities, we would like your advice on the question of research and development, how it should be handled.

Admiral NIMITZ. Just as I was leaving my duties as Chief of Naval Operations, the Secretary of Defense brought in one of the greatest scientists that we have, Dr. Bush, Vannevar Bush, and placed him in charge of the research and development agency in the Secretary's office.

I have had about 5 years experience in the handling and management of naval personnel, 3 years as an Assistant Chief of the Bureau of Navigation, as it was then called, about 2 years as the Chief of that Bureau, just before the war.

It is my opinion, based on my knowledge of the capabilities of officers in uniform, particularly in the Navy, and I presume the same holds in the other services, that the average officer in uniform is not qualified to conduct basic research. He is not trained for it. So, it is my belief that, as a general rule, basic research should be done under a civilian director of research under the control of the Secretary of Defense. There is no clear-cut black and white line of division. Each service has the need for some special research to be carried out under its own control.

In the Navy, a principal requirement at the moment is the development of the best antisubmarine detection devices and antisubmarine war weapons. The Navy is engaged in research on the problem, and that kind of research should continue, just as I assume that the Army might have a piece of equipment, a tank or something like that, that they were going to improve, that they should not be deprived of going ahead with that kind of research. I call that applied research. And I am sure the Air Force has similar problems. There are many things like that that will be in the province of the Secretary of Defense to point to the service, "You continue your experimental work with this or that project."

But, basically, I think the research should be done by people who are qualified for it, have the background for it. They should be people

who are not in the military service, not fighting men, and it should be directed by a civilian who has the confidence and the qualifications, under the control of the Secretary of Defense.

Mr. WEISL. Do you believe that the various research departments should have a separate and independent budget?

Admiral NIMITZ. I think that would be definitely within the province of the Secretary of Defense. If I were Secretary of Defense and I hoped to get the best talent into that basic research organization, I would give the Director the authority, and the responsibility, of handling his own budget.

SHORT-RANGE FUNDING OF RESEARCH UNFORTUNATE

Mr. WEISL. Should that budget provide for funding over a long period, and not be limited by a year-to-year determination?

Admiral NIMITZ. Well, I do not think that researchers work by—they do not work by the clock. There is no 8-hour rule among researchers. And some of their programs may cover a period of years, and I think that it would be very unfortunate if they had to live on just a year-to-year basis, and I am not qualified to say how many years' lead time or how long their budgets should stretch over, but I think that is something that the Secretary of Defense should have the authority to arrange.

Now, you mentioned the University of California. I was a regent of the university for 8 years, and I was a member of the atomic-energy committee of the regents for the whole period, and its chairman for the last 2 years.

During my period as Chief of Naval Operations, the Congress was confronted with the necessity of doing something about the control of atomic energy. You are all familiar with the congressional action that was taken to place the control of atomic energy in a joint congressional committee, and there was set up an Atomic Energy Commission to be the active working agency.

The Atomic Energy Commission contracted with the University of California to do a considerable amount of its research work, and, I presume, contracted with other universities that were similarly qualified throughout the country. But my knowledge is restricted to the University of California.

That university, under contract, operates the Los Alamos scientific laboratory for the Atomic Energy Commission. It operates the radiation laboratory in Berkeley and the radiation laboratory and Livermore on contract. The university has provided the researchers, the physicists, and they have been able. There are some Nobel prize winners among the lot. You have there a demonstration of how basic research can be done by contract by an agency of the Government.

Mr. WEISL. I thank you very much, Admiral Nimitz. My time is up, Mr. Chairman.

Senator JOHNSON. Admiral Nimitz, would it be accurate to say that we might have lost the Pacific war if the Japanese had been able to follow up their initial successes at Pearl Harbor and in the Philippines?

Admiral NIMITZ. I think yes,

Senator JOHNSON. How much time did it take you and us to rebuild the strength that we lost at Pearl Harbor?

SUBMARINES CARRIED ON UNTIL WE BUILT OUR STRENGTH

Admiral NIMITZ. Well, the Japanese came to Pearl Harbor on December 7, 1941. That day they successfully cleaned out all of the air defense that we had. They sank a number of our ships. They partially paralyzed the ability of our fleet to make an offensive move. I say partially, because they did not do it completely. They failed to destroy the submarine base. And it was our submarines that were sent out into the waters controlled by the Japanese and carried the load of the war for a number of months until we could rebuild our strength.

Had the Japanese come back a second day and burned the 4.5 million barrels of oil we had in surface tanks, as they could have done, with incendiary bullets, we would have been set back a long time. You may remember that, in 1942, the shortage of oil of our allies in Europe placed the greatest load on our oil industry and on our tankers.

We never could have built up that stock of oil again in any reasonable time. The Japanese could have come back and destroyed our naval installations at Pearl Harbor, which would have forced the fleet back onto the west coast. They did not do it because they were committed to a rigid plan. Not because they did not know what damage they had done. They knew perfectly well from their excellent photo coverage of the damage they had done. They did not do it because they were committed to a rigid plan and a rigid schedule, and the reason I emphasize that, Mr. Chairman, is because of the belief that exists that plans can be made and put in a top drawer and, at the appropriate time when the emergency comes, reach in the drawer, get it out, and start working on it. That is not the way it is done. People try to do it that way, but those plans are rarely followed.

The planning for emergency is usually for the first 2 or 3 moves, and then, depending on what your opponent does, your plans change accordingly. Planning has to be flexible.

THIS TIME WE WOULDN'T HAVE THE TIME

Senator JOHNSON. But time was very important to us, and they gave us time after Pearl Harbor to rebuild. Now in this atomic age in which we are living, and which was inaugurated while you were in command, do you think that we, in the next war, are going to have such time available to us to get ready?

Admiral NIMITZ. I am sure that, if a third world war comes, which I seriously doubt, if it comes, that we will be struck first.

Senator JOHNSON. And, if a major war should break out, we would very likely have to fight with what we had when it broke out, would we not?

Admiral NIMITZ. Correct.

Senator JOHNSON. How do you feel about a single Chief of Staff Admiral Nimitz? You have had great experience for a considerable time, both with the postwar policy of the country and in the active operation of the Navy. Do you feel that the command and planning functions should be carried out by separate staffs?

Admiral NIMITZ. No. I am firmly committed to the rule of authority and responsibility. The responsibility is with the Commander

in Chief, and the least amount of obstruction between the Commander in Chief and the people who execute his approved plans and orders, the faster we move.

So I would examine every proposed organization with the idea that nothing shall intervene between the constitutional Commander in Chief, who is elected by the people to make those decisions and the people in the field who have to carry them out.

It has been my experience that unified command in the field offers no problems.

General MacArthur had unified command in the Southwest Pacific. I had unified command in the rest of the Pacific. General Eisenhower had unified command in Europe. I see nothing that will not work in a unified command in the field. My experience with the various services was a most happy one, and there was never anything but the most wholehearted cooperation among the working services under the supreme commander in the area.

The Supreme Commander in the Washington area is the President as Commander in Chief, and any proposal to set up somebody else as a single commander between him and the forces in the field is totally wrong.

Senator JOHNSON. So, you are saying that the Commander in Chief is the single Chief of Staff now.

Admiral NIMITZ. He is the Commander in Chief. There is a difference between the Chiefs of Staff in my opinion and the Commander in Chief.

Senator JOHNSON. But he is the single authority right now?

Admiral NIMITZ. That is right; and by the Constitution.

OPPOSED TO SINGLE CHIEF OF STAFF

Senator JOHNSON. And therefore, you would not favor legislation that would vest in a single Chief of Staff authority now reposed in the Joint Chiefs?

Admiral NIMITZ. I would recommend earnestly against it.

Senator JOHNSON. But now, Admiral, during the early days of the war, during the time when you were trying to get decisions made, trying to build your forces out there, trying to hold the line and trying to save the Nation, didn't you find a great deal of redtape, delay, and frustration here in Washington and didn't you find the system that we had to be a very frustrating one and one in which it was difficult to get quick decisions?

Admiral NIMITZ. I have already indicated that I had a sense of frustration once or twice, and I was of the mind then, and so expressed my opinion, that a single source of decision, a Chief of Staff in Washington who had the authority to make the decisions, would be appropriate.

I subsequently, by hindsight and by my further experience and by my visits to Washington in the latter part of the war, changed my mind and concluded that a single Chief of Staff below the President was not desirable.

But I see nothing wrong with changing my mind. My hindsight persuades me that my impatience was illfounded and I am willing to say that I changed my mind properly.

Senator JOHNSON. Well, now, who made the decisions on how many men and how much material General MacArthur got during the war and how many men were to be made available to the Southwest Pacific area?

Admiral NIMITZ. The Joint Chiefs of Staff. The organization at that time was not a statutory one, as you may remember. It was set up by the President. There was another agency, called the Combined Chiefs of Staff, which included the Chiefs of Staff of our principal allies. When an operation affected those countries, they were called into consultation, as the combined Chiefs of Staff.

The actual orders and decisions that went on to American forces came out of the Joint Chiefs of Staff, after they had been approved by the President of the United States as the Commander in Chief.

Senator JOHNSON. Now, although at times you were perhaps impatient in wanting to have more than was available to you and to get ahead faster than circumstances would permit, in retrospect it is your considered judgment that it would not be in the national interest to have a single Chief of Staff?

Admiral NIMITZ.—That is correct.

Senator JOHNSON. Although at one time, under the pressures of war, you thought maybe you would go to that kind of a plan?

Admiral NIMITZ. Frustration and impatience. I was a younger man then.

Senator JOHNSON. What happened then, Admiral, when the Joint Chiefs got into an argument and could not agree on how to divide the men and material? As I remember, a lot of people thought we were concentrating too heavily on some areas and not concentrating enough on others.

Admiral NIMITZ. I am sure that there were many of those situations in Washington that never came to my attention. I had a full-time job out there, and only those in which I was involved did I know—of the conflicts as to the demands.

There is never enough war material.

Senator JOHNSON. I assume that the Commander in Chief had to finally say, "This is what goes to Europe and this is what goes to the Pacific," and that is how it was done.

Admiral NIMITZ. That is the only way it can be done.

Senator JOHNSON. And that is the way it should be done from here on out.

Admiral NIMITZ. Right.

Senator JOHNSON. And that is your testimony.

Admiral NIMITZ. Right.

ASSISTANT SECRETARIES SHOULD BE ADVISERS, NOT VETOERS

Senator JOHNSON. Now, Admiral, we do not want to get into personalities, because I guess there is enough blame to go around for everybody in America. It is not our purpose to try to find any scapegoats, since the Congress and the executive have together agreed on the present Pentagon organization. On the recommendation of men like you including the Secretary of Defense, and study groups, and others, we have created a layer of Assistant Secretaries. Practically every person who has testified before this committee has testified as

to the inability to get prompt decisions, the cumbersome organization in the Pentagon, and the redtape. They have said that one constantly has to swim through seaweeds to get a decision made; and that although the Secretary of Defense has the necessary authority, from the time the request is initiated until the time the Secretary receives it, we go through such a cumbersome procedure that weeks and even months sometimes elapse.

It is your present considered judgment we made a mistake when we legislated additional Assistant Secretaries of Defense and put them in the chain of command?

Admiral NIMITZ. Yes; when they were put in the chain of administrative control.

Senator JOHNSON. So your recommendation would be that we abolish the Assistant Secretaries of Defense which we created; and that where we need men to assist the Secretary they be set up as special assistants, leaving the full power of decision in the Secretary?

Admiral NIMITZ. The power of decision should be left in the Secretary. He should be free to choose the talented people that are available in this country to come to him and advise him, and they should have no veto power other than their influence over the Secretary to veto or approve.

That, I think, would speed up business. I would like to make one additional observation: I think that all of us are old enough to know that it is not an organization—lines drawn on a paper that make an organization work. The organization plan is merely a tool of administration. It is the men who occupy the positions in that who make an organization work.

We have just now called into the Defense Department a prominent industrialist, whom I have met for the first time yesterday when I called on him. He is a successful industrialist. The last thing that should be done would be to pressure the Secretary of Defense and hasten him into changes before he has a chance to look into his own organization. Let him come up with a plan.

He has heard and read plenty about the delays that have occurred in the Secretary of Defense's organization.

RECOMMENDATION FOR REORGANIZING PENTAGON

Senator JOHNSON. So what you are saying, then, is that you personally feel it was a mistake to create the Assistant Secretaries; that so far as the reorganization of the Department, which everyone, from the President in his state of the Union message on down, admits needs reorganizing, is concerned, the Congress should give the Secretary of Defense an opportunity to study the whole matter thoroughly and make his recommendations to the President; and then after the Secretary and the President have determined what course they would recommend, we should then evaluate it, study it, and make our recommendations?

Admiral NIMITZ. Well, I think there are a lot of things that can happen simultaneously to shorten the time. But I do believe that a responsible man should have the opportunity of organizing what is the biggest business in this country, the disbursement of about \$40

billion; he should have the opportunity to set up his own organization.

And it is my belief that the assistants he has should not be stacked up in layers so that every decision comes up through every assistant. Their influence should be exerted on the Secretary whom they serve, and the Secretary should make the decision.

Senator JOHNSON. And it is your opinion the Department needs reorganization?

Admiral NIMITZ. I think that would speed up decisions and speed up business.

Senator JOHNSON. And it is your opinion that the Department needs reorganizing?

Admiral NIMITZ. I have never seen any organization that did not need reorganizing. [Laughter.]

Senator JOHNSON. And it is your opinion this one needs reorganizing?

Admiral NIMITZ. Yes, sir.

Senator JOHNSON. Thank you, Admiral.

Senator Flanders?

Senator FLANDERS. Mr. Chairman, I came in a bit late on this, and I will pass.

Senator JOHNSON. Senator Smith?

Senator SMITH. I have no questions, Mr. Chairman, but I would like to join you in welcoming this great gentleman here.

Senator JOHNSON. Thank you, Senator Smith.

Senator Bush?

Senator BUSH. I thank you, Mr. Chairman. I also join in welcoming our distinguished admiral here today.

I was interested in, very much interested in your testimony here, Admiral, and this question that the chairman has been pursuing, I think is one of the most important questions that has developed in connection with these hearings.

Now I recall that in or at the close of World War II you, I thought, from testimony which I read, which was taken by a committee representing the three services, and I think Col. Trubee Davidson was a fourth member of that committee, as I remember those names, that at that time you testified before that committee, and in their report they said that you were one of those who favored a unified command organization.

And then I understand that later you changed your mind about that; is that true?

Admiral NIMITZ. That is correct. I do not know whether you were in the committee room when I stated that I once believed a single Chief of Staff to be necessary, but that later I changed my mind.

I think a commander should have a flexible mind as well as a flexible plan.

HE HAD THE AUTHORITY BEFORE HE HAD THE TOOLS

Senator BUSH. Well, now, in World War II, how long did it take for the system of the unified commands to become effective in these various areas where it was established you mentioned?

Admiral NIMITZ. Shortly after the war started, it required only a brief time to get the President's approval for me to be the supreme commander in my part of the Pacific, and General MacArthur to be the supreme commander in his area.

That decision came very promptly. Authority and responsibility was imposed on me very soon after I arrived in the Pacific. I was a supreme commander before I had much of any forces to employ.

The ships, except our submarines, were either on the bottom at Pearl Harbor or they were on their way to the west coast Navy yards to be repaired. I had supreme authority long before I had the tools to work with.

Senator BUSH. So you were able to sort of put it together as your material and men accumulated; is that right?

Admiral NIMITZ. Yes, sir.

Senator BUSH. You built the forces gradually?

Admiral NIMITZ. Yes.

Senator BUSH. Well, now, do you think that under modern conditions, under the conditions that we face today, or the possibilities that we face today, of an attack from an enemy, that you are going to have time, that any commander that our Armed Forces are going to have time as we had in these other years, and particularly in World War II?

Admiral NIMITZ. Senator Bush it is my understanding that supreme commanders in various areas are already designated. They have been named ever since the war. Our system of unified command in the field covers the whole earth right now, has been for years.

Senator BUSH. Well, that is right, we have got it in the NATO and we have got it, Admiral Stump, I believe has it.

Admiral NIMITZ. Yes.

Senator BUSH. And we are using it in the field now.

Admiral NIMITZ. We are using it in the field now, and I have every confidence that it will work, because it has worked, it has worked in the past, and it will work.

STRATEGY VERSUS TACTICS

Senator BUSH. It has been very difficult for me to see why when we always turn to it in the field, and we have it in the Navy with your air, sea, and land forces, namely the Marines; it is very difficult for me to see why we resist in Washington, so to speak, where we find it to be the most efficient way to conduct a war in the field.

Why should not those same methods be adaptable to the senior command of all commands?

Admiral NIMITZ. Well, Senator, I have only my own ideas on it, and I will be very glad to present my views.

The decisions that are made in the field are tactical. The fundamental difference between strategy and tactics is that tactics is what you do after you are in contact with the enemy. Strategy is what you do before you come in contact with the enemy or even before you come into a war with him.

Tactical matters are settled very promptly in the field by a single source of decision. Strategical matters involve such things as the preparation of forces, the planning of bases overseas, and aid to allies.

It might even include a recommendation to the President to get Spain on our side as an ally.

Strategical decisions are primarily made in Washington, and they are usually of such a nature that time is not so important.

But what is important is the careful consideration that has to be given to measures of that kind that involve so much of the Nation's capacity to conduct war. Those are all strategical decisions, and I think it would be harmful to make decisions like that hastily. These are decisions in which the Congress not only is interested but has responsibility because of its constitutional requirement to maintain armed forces.

Our foreign relations, the conduct of them is in the hands of the executive department but what those policies shall be is a joint responsibility of the executive and legislative branches of the Government.

Senator BUSH. That is right.

Admiral NIMITZ. So to answer your question very briefly, tactical situations require instant decisions, whereas in strategical decisions you can sometimes take months or years before you decide what you are going to do.

Senator BUSH. And that is your basic reason for opposing this—

Admiral NIMITZ. That is my opinion. I do not know what is in the minds of the people that were here. But that is just what I would conceive to be the situation.

PRIDE OF SERVICE VALUE TO BE PRESENTED

Senator BUSH. What do you think about this recommendation that came up in the Rockefeller report to wit, that all officers of flag rank or general officer rank should be classified as simply general officers of the armed services and detached from the separate departments?

Admiral NIMITZ. Well, I do not think much of it.

You cannot, by a scratch of the pen, eliminate certain values which are difficult to define, tradition, and pride of service, pride of accomplishment. When you classify them simply as general officers of the armed services, detached from their own service, you are making faceless men.

Senator BUSH. I yield, Mr. Chairman, thank you.

Senator JOHNSON. Thank you very much, Senator Bush.

Senator Symington?

Senator SYMINGTON. Admiral, it is a pleasure to see you again, sir.

Admiral NIMITZ. It is a pleasure to see you, sir.

Senator SYMINGTON. Everybody knows of your magnificent contribution to the great victory in World War II and it is an honor to have you with us.

Mr. Chairman, Senator Kefauver and I are both cosponsoring a bill on emergency credit for disaster areas. He has agreed to stay at the hearings on that, while I came here. He asked me to explain why he is not with us.

Senator JOHNSON. I should like the record to show that Senator Kefauver is attending another meeting, that Senator Stennis, the vice chairman of this committee, is presiding over the Construction Subcommittee of the Armed Services and that Senator Case and Senator Jackson are with him in that committee.

We regret it is necessary to have several committees meeting at the same time particularly when we criticize the Pentagon for doing that. [Laughter.]

But we have a very important supplemental bill that requires authorization before we can get an appropriation for it so we are trying to get that bill reported to the full committee. Admiral, that explains the absence of Senators Stennis, Jackson, and Kefauver, and Case.

Proceed, Senator Symington. This will not be taken out of your time.

RATIONALE OF CHANGED VIEW

Senator SYMINGTON. Admiral, in April 1945 in a report made by the majority of the Joint Chiefs of Staff Special Committee for Reorganization of National Defense, in the summary of their conclusions, they say:

The special committee excepting the senior naval member is unanimously in favor of a single department system of organization of the Armed Forces of the United States. This view is supported by Generals of the Army MacArthur and Eisenhower, Fleet Admiral Nimitz, Admiral Halsey, a substantial number of other commanders in the field, and many officers in Washington.

I believe you testified on that to the counsel and Senator Bush. Is there any other comment that you would like to add to your 180° turn in this matter?

Admiral NIMITZ. I prefaced, I believe, my remarks to the committee that I had completely changed my mind. I had a deep sense of frustration at a period when there was a debate as to the best way to get across to the Japanese, whether to go straight across the Pacific or up from Australia—that was the basic difference in the debate. And it took a long time to secure a decision on that. And in my frustration, I agreed to that statement which you have just read.

By the time the war ended, I had changed my mind; I had seen the workings of the organization, and I was willing to acknowledge and accept the delays. I was convinced that I was unduly impatient and was willing to change my mind.

And I might say that it was not under any pressure, Senator. I did that of my own accord. There was nobody pressing me.

Senator SYMINGTON. Thank you, Admiral. I think Admiral Halsey also changed his mind, and he made a very strong statement about the importance of a single command.

Admiral NIMITZ. Senator, you are talking about one of the most distinguished officers of the war when you speak of Admiral Halsey.

Senator SYMINGTON. I fully agree to that.

Admiral NIMITZ. He and I and many others, when we felt we were ready to go, wanted decisions, and we had a sense of frustration when decisions were delayed.

Senator SYMINGTON. Do you not think that the new missile picture will increase the necessity for fast decision rather than reduce it?

Admiral NIMITZ. I think that you get fast tactical decisions when you need them, and I think that the Joint Chiefs, sitting in Washington, with all of the information at hand, are in a better position to decide how speedily this decision should be made. I am willing to accept their judgment.

Senator SYMINGTON. And your opinion is based upon the importance of having all the Chiefs in fairly constant and close contact with the President?

CHAIRMAN ALLEGED WITHOUT AUTHORITY OR EXECUTIVE RESPONSIBILITY

Admiral NIMITZ. I do. I am so convinced of that, that I suggest that this committee question the present Chiefs to see whether each in turn, could not serve as the spokesman of the group, and thereby remove one layer.

When you take distinguished officers like General Bradley and Admiral Radford and put them in the position of a chairman, where they have no authority and no executive responsibility, they are in an anomalous position.

By reason of his being a separate chairman, a lot of minor duties have devolved upon him that have nothing to do with the conduct of war in the field.

The President will not always be a military man and the President will not have that close acquaintance with personalities that our Commander in Chief now has.

So I think it is essential that the Commander in Chief, who must make the responsible decisions, have a very close contact with each Chief of Service.

Senator SYMINGTON. Thank you, Admiral.

Then, summed up, you feel that it is important if it is to work, that the various members of the Chiefs should have a reasonably constant association and opportunity for discussion with the Commander in Chief; is that correct?

Admiral NIMITZ. I certainly do.

Senator SYMINGTON. Have you read the declassified testimony of General Twining with respect to how many times he has discussed the question of departmental reorganization with the President since he has been Chairman of the Joint Chiefs?

Admiral NIMITZ. I have not seen it.

Senator SYMINGTON. Thank you, Admiral.

Now, you mentioned Dr. Bush, and I fully agree with you that Dr. Bush is a great scientist and a great American.

But would not there be some danger, if you took the research and development away from the services and put it into a separate agency, that it would not come up with the weapons that the services wanted?

PEOPLE IN UNIFORM SHOULD HAVE HAND IN DEVELOPMENT OF WEAPON

Admiral NIMITZ. It is for that reason that I suggest that basic research, pure research, be safely and properly put in the hands of a distinguished director of science who knows the general problems, and with a budget that will enable him to function over a period of time.

There comes a time when ideas have to be translated into application. The reason that I would like to see this under a civilian director—under the Secretary of Defense—is that at that time, the Secretary could move in with his organization and start applying designs.

Each military service has a few gifted people in uniform who are qualified to conduct research.

I think it is very unfair to place a man in uniform in charge of a research operation when his function as a naval officer or an Army officer is to command. A pure research assignment can definitely decrease his value as a commander in the field.

Most people join the Armed Forces to serve in the field. When the time comes for a product of basic research to be considered for use in service, uniformed personnel from the services can be loaned to the research agency to determine possible future use.

The time comes when you have to take a project away from the research people and put it into the hands of a production engineer to build a prototype. Then the people in uniform come in full force—they have been in touch with it all the time and they should be the ones to test it and approve it.

As I pointed out before you came in, Senator, each service has projects that are peculiar to its service on which laboratory research goes on. The Air Force, I am confident, has in their laboratory centers projects for improving communications, for improving the aiming of bombs or the release of bombs, and these projects should not be taken away from them.

The Navy conducts its own research on many problems peculiar to the Navy, such as the kind of paint to put on the bottom of a ship to prevent corrosion and resist barnacles.

Senator SYMINGTON. Admiral Nimitz, excuse me, my time is up. You think that basic research should be in a separate agency, but when it becomes applied research it should go to the services.

Admiral NIMITZ. It should be under the Secretary of Defense.

Senator SYMINGTON. You mean basic research should be under the Secretary of Defense?

Admiral NIMITZ. Yes; I think so.

Senator SYMINGTON. Then you are saying that instead of having more unification with less departments we should have more unification with more departments; is that correct?

Admiral NIMITZ. Well, I will rest my case with the new Secretary of Defense and see what organization he comes up with.

Senator SYMINGTON. Well, I was asking not for his opinion, but yours.

Admiral NIMITZ. Well, I am not qualified to give that because I am not an expert on the organization in the office of the Secretary of Defense.

Senator SYMINGTON. Thank you, Admiral.

No more questions, Mr. Chairman.

Senator JOHNSON. Counsel, any more questions of Admiral Nimitz?

RESPONSIBILITY FOR SOLUTION OF TACTICAL AND STRATEGIC PROBLEMS

Mr. WEISL. I would like to ask one question, Admiral.

You spoke with great admiration of Dr. Bush's efforts during World War II.

Dr. Bush testified before this committee. He stated that a civilian Secretary of Defense, no matter how successful he may be in civilian life, is in no position to pass on military strategy or war plans. Therefore, when he gets a divided opinion from the Joint Chiefs, he ought to have at his command an independent military advisory

board consisting of men like yourself who can give him independent advice so that he can make a rational decision.

Do you agree with that concept which Dr. Bush expressed to this committee?

Admiral NIMITZ. I think the kind of decisions that Dr. Bush had in mind are not in the tactical field. I think that tactical decisions come quickly.

When the Department of Defense was set up it was the concept that the three Chiefs of Services would be the principal advisers of the Secretary of Defense. That the Secretary of Defense, and the Commander in Chief would consider the advice given by the three Chiefs of Services. When such advice conflicted, was not unanimous, the President and the Secretary of Defense should evaluate it from their knowledge of the personalities of the Joint Chiefs.

Mr. WEISL. Well, then, I do not quite understand—do you agree—

Admiral NIMITZ. I do not agree with Dr. Bush in the need of an independent Military Advisory Board for the Secretary of Defense.

That is not a scientific problem. I would not venture to disagree with him on a scientific problem.

Mr. WEISL. That is all I have, Mr. Chairman.

Senator JOHNSON. Mr. Byrd, Mr. Johnson, Mr. Kefauver, Mr. Saltonstall, Mr. Bridges, Mr. Flanders?

Senator FLANDERS. Admiral, you have made a very clear distinction, it seemed clear to me, between tactical questions or problems and strategic problems, and you have, as I have understood you, made a clear case for leaving the tactical problems in the hands of the Joint Chiefs of Staff.

Do I understand that strategic problems, would, in general, be within the area of the Secretary of Defense and the President?

Where does the responsibility for the solution of strategic problems rest?

Admiral NIMITZ. Senator, I think you have put your finger on a very important point that was foreseen in the writing of the National Security Act of 1947.

Strategic problems affect not only the military services, but the people of the country as a whole. They affect the Treasury, they affect the industry generally, they affect labor.

It was to consider those problems that the National Security Act included as one of its first agencies the National Security Council, which was to be presided over by the President as frequently as he could, or by the Vice President. It was to be composed of the Secretary of Defense, the Chiefs of the Armed Services, the Secretary of the Treasury, the Secretary of the National Security Resources Board, and others.

The National Security Resources Board was set up to include all of the alphabetical agencies that existed during World War II engaged in the production of material, in the production of food, in the distribution of manpower, et cetera. The National Security Resources Board has never functioned.

The strategic problems that you have in mind should be settled by discussion in the National Security Council with the Treasury represented, and any other Cabinet head whose business is affected because strategic decisions can affect every part of the country.

Senator FLANDERS. Admiral, you have——

Admiral NIMITZ. But it is not a decision that is left in the hands of three military chiefs.

Senator FLANDERS. I think, Admiral, that you have made a very clear and pertinent contribution in what you have just said with regard to the responsibility for strategic decisions.

Now I wonder whether you want to say anything as to whether or not, in your judgment, the National Security Council is occupying that position at the present moment, is accepting its responsibility and is effective in carrying it out?

Admiral NIMITZ. Senator, I am not qualified to speak on that because I do not see the results of it. Unless the results are publicized, I do not see them. And I am sure that a great deal of the discussion in the Security Council is on classified matters and is kept in a security status, so I am not qualified to speak on that.

I do think that members who actually serve in the Security Council would be the most competent to say whether the Security Council functions as it was designed to function in the Organizational Act.

Senator FLANDERS. Admiral, may I say that I suffer the same lack of a basis for judgment that you do, and the National Security Council does not in any public manifestation seem to be taking direct responsibility and carrying out that responsibility administratively in the field of strategy.

Perhaps it cannot do it in any way that we would see or would understand, but I doubt if the American people, as a whole, have that concept of that major responsibility which lies in the hands of the National Security Council.

Thank you.

Senator JOHNSON. Thank you, Senator Flanders.

Senator Stennis?

Senator Smith?

DETERRENT ABILITY THE INSURANCE AGAINST WAR

Senator SMITH. Yes, Mr. Chairman.

Admiral, you stated that if world war III should come, and you felt that it would not, we would have to fight such a war with the military forces which we would have at that time.

Could you explain why you feel that there will not be a third world war, and whether you foresee a greater danger in the smaller, limited wars?

Admiral NIMITZ. The people the world over are tired of war. The leaders of some countries for their own purposes keep the world stirred up, and take a threatening posture.

As long as our probable opponent has that threatening posture, we must be prepared to retaliate to the maximum capability that we can.

The people who control Russia are not stupid. They recognize our strength and they probably have a better estimate of our capabilities before them constantly than most of the people in this country are aware of.

It is the deterrent nature of our ability to retaliate instantly and heavily that is the best guaranty against world war III. As long as

we preserve that ability to strike and retaliate heavily, there will be no war.

With the passage of time, and with the great educational program in Russia and with widespread increase in general education, the time will come when there will be internal changes in Russia to lessen the danger of a world war.

Senator SMITH. Admiral, do you think there will be a continuation of the small, limited wars?

Admiral NIMITZ. I think that we must always be prepared to handle anything short of or anything up to the maximum.

Senator SMITH. I gather that you think the people are tired of war, but it is the leaders who start wars, and they are not the people; is that what I understand correctly?

TECHNIQUE TO REMAIN IN POWER

Admiral NIMITZ. I think the people who have to fight the wars are very anxious to avoid further war. I believe that the ruling group in Russia sometimes keeps itself in power by advertising the great threat of this country to their country, and keep their people willing to make the sacrifices they make.

Senator SMITH. Admiral, would you give the committee the benefit of your views on the emphasis which you think the United States should place on programs for the outer space?

Admiral NIMITZ. That is out of my field.

Senator SMITH. Do you care to comment?

Admiral NIMITZ. We should not let any country get ahead of us in probing outer space. As to what can be done with the knowledge so gained I don't know.

The fact that the Russians beat us in getting a satellite orbiting indicates they have made great scientific progress.

We never underestimated the Russian ability in science, at least I never did, and we never underestimated the Russian's ability as a soldier, a fighter. I am sure that the Russians cannot do everything at the same time. For instance, they cannot march through Western Europe, into the Middle East, and overrun other countries, all at the same time. I don't think they have that capability.

CHANGES IN ROLES AND MISSIONS SHOULD AWAIT PROOF OF MISSILE CAPABILITY

Senator SMITH. Admiral, is it your belief that technological advances have in a sense rendered obsolete our concept that the roles and missions of the separate services should be based upon the land, sea, and air environment in which they fight?

Admiral NIMITZ. There have been technological advances, in certain weapons but I am right from the center of Missouri when it comes to the effectiveness of these weapons. It still has to be proved to me that these missiles can be put on a military objective at a great distance; and by a military objective, I do not mean a crowded non-combatant community.

The roles and missions of the services should be under constant review. I would regard such review as one of the most important duties of the Secretary of Defense.

Senator SMITH. Admiral, do you think that as these changes are needed, you would make the change through an amendment to the Unification Act, or through unified command?

Admiral NIMITZ. I do not think so. I would be willing to be consulted at that time, and I would be willing to take into account what has happened between then and now and look at it again.

Senator SMITH. But you would make the changes through the Unification Act?

Admiral NIMITZ. Yes. I think the National Security Act of 1947 is one of the best acts that has ever been passed to tie together the military capabilities of our people.

Senator SMITH. Thank you, Mr. Chairman.

Senator JOHNSON. Thank you, Senator Smith.

Senator SYMINGTON?

Senator SYMINGTON. Admiral, if these missiles turned out as well as their adherents say they will, then would you be for a more unified command?

Admiral NIMITZ. Yes. If these missiles turn out as they are supposed to, the Commander in Chief of the United States, the President, should be the man to direct their use, and not through a single Chief of Staff.

I think that the only justification, Senator, for these terrible weapons of mass destruction is their deterrent power in preventing world war III.

HE WOULD NOT INTERPOSE AUTHORITY BELOW THE PRESIDENT

Senator SYMINGTON. We have had some testimony that these missiles are going to be ready pretty soon.

Admiral NIMITZ. That is right.

Senator SYMINGTON. We are both optimists about the United States. Do you not think we might start changing this organization now, instead of waiting until we are attacked by the Russians with missiles, when it might be too late?

Admiral NIMITZ. Senator, I think the release of these terrible weapons of destruction is one of the greatest responsibilities of the Commander in Chief of the Armed Forces of the United States. And I do not want to have anybody underneath him to have that authority.

Senator SYMINGTON. I want to express my appreciation for your courtesy in coming before the committee, and my pleasure in seeing you again.

Admiral NIMITZ. Thank you.

Senator SYMINGTON. No further questions.

Senator JOHNSON. Thank you, Senator Symington.

Senator Case?

Senator Jackson?

Senator Bush?

Senator BUSH. No questions.

Senator JOHNSON. Senator Ervin? Senator Barrett? No questions.

Senator JOHNSON. Admiral Nimitz, I want to read you two sentences and ask you to comment on them. I do that because you seem to have said somewhat the same thing. They are important sentences, and I think they are important to the committee and to the country.

The United States could not survive on the basis of a purely defensive policy of massive or graduated deterrents. These will at best hold the strong terrain. The United States must combine its defensive deterrent strategy with a military attack strategy that reduces the Soviet strength well below that of the free world, and then persuade the Soviets to accept the role of a peaceful, though strong, nation in the world of free nations.

Would you agree with that statement?

Admiral NIMITZ. Could I look at that? My hearing is not too good. Could I, would you pass that down and let me have a look at it?

Senator JOHNSON. No, I would like to read it to you again.

ADMIRAL AGREES PURELY DEFENSIVE POLICY IS INADEQUATE

Admiral NIMITZ. All right.

Senator JOHNSON (reading) :

The United States cannot survive on the basis of a purely defensive policy of massive or graduated deterrents. These will at best hold the strong terrain. The United States must combine its defensive deterrent strategy with a military attack strategy that reduces the Soviet strength well below that of the free world, and then persuade the Soviets to accept the role of a peaceful, though strong, nation in a world of free nations.

Admiral NIMITZ. I will accept that.

Senator JOHNSON. So, in summary, what we are confronted with is at best, that if we maintain superiority or equality, we simply negate what the Soviet Union is doing. The result is that if we are lucky and if the best happens, we have to look forward only to the expenditure of 40 or 50 or 60 or 70 billions a year, unless and until we can find some way of convincing them that we can live in the world together.

Admiral NIMITZ. Yes. And my acceptance of it does not include the idea of preventive war.

Senator JOHNSON. Nor do I, and I do not think the committee will include that.

Any other questions of Admiral Nimitz?

(No response.)

Senator JOHNSON. Admiral Nimitz, on behalf of the committee, the Preparedness Subcommittee of the Senate, I want to express to you our gratitude for your willingness to come so far and testify so thoroughly on a subject in which you alone have a unique position.

As usual, you have made another great contribution to your country. We of the committee, aside from our pleasure in having an opportunity to welcome you and seeing you again and shaking your hand, want to thank you for the judgments you have expressed, the opinions you have rendered, and for your courtesy in counseling with us this morning.

Thank you again.

Admiral NIMITZ. Thank you, Senator, for the privilege of coming here. It is not only a privilege but a highly honored duty that I have.

Senator JOHNSON. Thank you, Admiral Nimitz.

You are excused.

Our next witness is Gen. Carl Spaatz.

General Spaatz, will you please come to the witness chair? Is General Spaatz in the room?

General Spaatz, as is customary, we administer the oath to people testifying before this committee. Will you raise your right hand?

Do you solemnly swear the testimony you give this committee will be the truth, the whole truth, and nothing but the truth?

General SPAATZ. I do.

Senator JOHNSON. Be seated, General.

General Spaatz, it is a great pleasure to have you with us today. Your name is associated with airpower in this country, and you have one of the most distinguished records of our combat flying men.

As former Commanding General of the Army Air Force and as Air Force Chief of Staff, this committee is quite eager to have your opinions and your judgments.

General Spaatz, you have so many distinctions that it would take me too much time to list all of them. America knows you as one of our great soldiers. I ask unanimous consent of the committee to insert in the record at this point a brief biography as a method of qualification.

Without objection, this biography of General Spaatz will be inserted in the record at this point.

(The biographical sketch referred to follows:)

GENERAL CARL SPAATZ (RETIRED)

General Spaatz was born June 28, 1891, and was graduated from West Point in 1914. He held many important assignments until he was made Chief of the Plans Division, Air Corps, in 1940; Chief of Air Staff 1941; Assigned Chief Air Force Combat Command, 1942. He then became Chief Air Adviser to General Eisenhower, North Africa, December 1942; deputy air commander, North African Theater of Operations, 1943; commander of the Northwest African Air Forces, Sicily, 1943. He was appointed commander in chief of the United States Strategic Air Force in Europe, January 1944, and was appointed commander in chief of the Strategic Air Force against Japan in July 1945. He was assigned to Headquarters, AAF, Washington, in October 1945, commanding general of the Army Air Forces in 1946; Chief of Staff, Air Force, Department of Defense, 1947-48. General Spaatz retired from the Army Air Force in July 1948.

He has been awarded the Distinguished Service Cross, the Distinguished Service Medal with 2 Oak Leaf Clusters, the Legion of Merit, the Distinguished Flying Cross, Bronze Star, and many other decorations during his long illustrious military career.

TESTIMONY OF GEN. CARL SPAATZ, FORMER CHIEF OF STAFF, DEPARTMENT OF THE AIR FORCE

Senator JOHNSON. General Spaatz, again we welcome you.

Do you have a prepared statement you would care to make to the committee?

General SPAATZ. Mr. Chairman, I am glad to appear before your committee. Its recommendations and the resultant actions of Congress will have a decisive influence on the future of our country. It is important that our military organization and our military strength be subjected to critical review by our representatives in Congress. Other than this, I have no prepared statement but place myself at your disposal for such questions as you may wish me to answer.

Senator JOHNSON. Thank you, General Spaatz.

Counsel, will you proceed with your examination of General Spaatz?

Mr. WEISL. Thank you, Mr. Chairman.

You were Chief of Staff of the Air Force from 1947 to 1948; were you not?

General SPAATZ. I was; yes, sir.

Mr. WEISL. What was our policy in the past on these problems of military preparedness?

General SPAATZ. Well, the Joint Chiefs of Staff, of course, always tried to do the best they could with the resources that were made available.

However, in many cases in the distribution of the funds that would come up for procurement, development, and procurement of hardware of the future, there were areas in which decisions were very hard to reach by a committee.

Senator JOHNSON. Counsel, I have to be away from the committee room for a few minutes. Senator Symington, would you come to the chair and preside?

OFF AGAIN, ON AGAIN, POLICY SINCE WORLD WAR II

Mr. WEISL. I did not quite hear your answer. I asked what was our policy with reference to military preparedness in the past, was it consistent. Or was it turned on and off?

General SPAATZ. Well, during the period since World War II, it seems to me that the military policy in this country has been to demobilize and then turn on the faucet and build up and then turn it off and fall back, an operation which is most expensive in the handling of our resources for military purposes. As I said, this has happened several times since World War II.

Mr. WEISL. General Spaatz, we have had considerable testimony about our long lead time as compared to the Russians. That it takes us in many instances as much as twice as long to perfect a weapons system as it does the Russians.

Would you like to comment on the reasons for this lag?

General SPAATZ. Well, it appears to me that the Russians have a more direct method of going ahead with a project from the time of the inception of a particular piece of hardware until it is placed into production.

Whereas under our present organization, there appear to be committees, delaying decisions. This has greatly extended our lead time in getting our hardware where it belongs.

A very dangerous thing, because if continued, we can be assured that with the Russians' decreased lead time they will eventually, if not now, have better hardware ready to go to war than we have.

Mr. WEISL. How do you believe, General Spaatz, based upon your experience as a soldier and as an executive in the military department in all its phases, that this lead time can be cut down?

General SPAATZ. I think the first move is proper organization of the Defense Department.

I might say that to meet the Russian threat, we need both military and economic strength. The so-called man on horseback may appear from the collapse of our economy or from the lack of military strength.

In the latter case he will be a Russian general.

ADVOCATE OF SINGLE CHIEF OF STAFF

Mr. WEISL. General Spaatz, you have no doubt studied the scientific developments which are increasing the complexity of our weapons system, and the complexity of their use by the military forces.

Would you care to comment on how this problem should be met?

General SPAATZ. Well, first, we cannot decrease the complexity of our weapons systems, due to the rapid scientific developments that are taking place.

To impose over this complex weapons system a complex military organization is compounding the problem.

If you have a complicated system down below, you want a simple efficient system on top of it.

Mr. WEISL. How should that system on top be simplified in your opinion?

General SPAATZ. First, by providing a single Chief of Staff to the Secretary of Defense instead of a committee as we have now.

Mr. WEISL. We have had testimony on that subject, and many have stated that a single Chief of Staff would lead to military dictatorship, that it would place too much power in the hands of one person, that it would Prussianize the country and so forth.

Would you care to comment on that?

General SPAATZ. You must view the position of the Chief of Staff, as the Chief of Staff to the Secretary of Defense.

He is not a military commander. He issues orders in the name of the Secretary of Defense who, in turn, represents the President of the United States.

So between the Chief of Staff and his chance of becoming a military dictator, you have several echelons. You have the Secretary of Defense, you have the President, you have the Congress before whom the military must come for their appropriations, and you have an enlightened American people that would not stand for any such nonsense.

Mr. WEISL. Would the Chief of Staff, a single Chief of Staff organization, have a staff organization under him.

General SPAATZ. He would have to have under him a competent staff of officers from all of the services, not a tremendous number, but a competent staff. The most brilliant officers of the services should be placed on his general staff. And in being placed there, they must be removed from then on from the jurisdiction, administration, of their own services. Then they will be able to act on this staff in reaching their solutions to the problems freed from any adherence to their own services.

They must be removed from the administrative control of their own service from the time of assignment to the general staff.

Mr. WEISL. What would become of the Joint Chiefs of Staff?

General SPAATZ. They would go back to their services and command them.

And they would be advisers to the single Chief of Staff, the Secretary of Defense, to give their opinions, but they would have no vote or say-so in decisions that would be reached other than their advice and recommendations.

PRESERVE ESPRIT DE CORPS AT LOWER ECHELONS

Mr. WEISL. Would you care to tell the committee what, in your opinion, is wrong with interservice rivalry as it now exists?

General SPAATZ. Well, I think rivalry may not be bad, but it should be down at the lower echelons. One likes to think that the outfit he belongs to is better than the others. If you are in one fighter squadron you like to think your squadron is the best of all in the group.

That sort of rivalry promotes efficiency in the units. But rivalry at the top may become disastrous.

Mr. WEISL. General, would you care to comment on the present system where the Joint Chiefs represent their individual services, and whether that leads or does not lead to duplication and waste?

General SPAATZ. Well, I think the result of that has been obvious. I think there can be no question but what there has been duplication and waste in the Defense Department since the war and during the war.

We have spent \$400 billion since the end of World War II which is quite a sizable amount of money, and it is anyone's guess as to how much of that could have been saved, if we had had a better organization in the Defense Department, or if not saved how much more our defenses now would have been improved.

Mr. WEISL. Please give some illustrations of what you are saying.

General SPAATZ. Well, I think there are 37 different types of missiles being developed by the services. That certainly seems to me to be too many. And it is due to the fact that each service wants to move into the missile field regardless of whether each phase of missile development intermediate range, the long range, all the other phases, are necessary for each service's operation.

There has been a tendency, I would say, for each service to try to move into all fields, to fight the next war all by itself, instead of as a team.

Mr. WEISL. Does that lead to duplication of the use of weapons by each service?

General SPAATZ. It leads to duplication in the development and the production of weapons, and duplication in providing the units for their operation after they are developed.

Mr. WEISL. Does it also lead to loss of time in the development of weapons?

General SPAATZ. It can very well lead to that, based on the availability of resources in the form of scientists and specialists that are needed for the development of the more intricate missiles; it could lead to slowing down of the ultimate day of production.

OVERABUNDANCE OF ASSISTANT SECRETARIES

Mr. WEISL. Do you have any comments on the problem of the Assistant Secretaries of Defense in the civilian ranks?

General SPAATZ. Nothing except to say I think there are too many of them.

Mr. WEISL. How would you handle that problem, if you were the Secretary of Defense?

General SPAATZ. Well, of course, the way I would handle it is to come to Congress for a change in the law to get the Defense Department organized the way it should be.

Mr. WEISL. Would you eliminate the Assistant Secretaries and make them special assistants to the Secretary as Admiral Nimitz testified?

General SPAATZ. I think that is rather immaterial. I think if you have a single Chief of Staff and a general staff, that the proper organization will begin to shape itself.

However, I do believe that the civilian Secretaries in the three services, I mean the Secretary of the Army and his assistants, the Secretary of the Navy and his assistants, and the Secretary of the Air Force and his assistants should be eliminated. The military commanders of the three services would then be under the Secretary of Defense.

Mr. WEISL. Have you read the Rockefeller report, General?

General SPAATZ. I have read it, sir.

Mr. WEISL. Would you care to comment on their recommendation that the Defense Department should be organized militarily on the basis of strategic task forces rather than on the present basis of a separate Army, Navy, and Air Force?

General SPAATZ. Well, we have overall commands now, the Air Defense Command, for instance, under the present setup. Now just what task forces we are to have at any particular time depends on the situation, both with reference to the threat, whatever it may be, and the weapons we have.

I think those commands would normally be composite commands to meet the particular situations. But they are matters for constant study, and the general staff or military staff provided to the Secretary of Defense would be the agency most qualified.

This military staff is the most competent agency to determine and recommend what the various commands should be at any particular time in our history.

OPPOSED TO FREEZING BY LAW OF ROLES AND MISSIONS

Mr. WEISL. Under the present law, the roles and missions of the various divisions or departments are fixed by statute. Do you believe that should be changed?

General SPAATZ. I certainly do. The roles and missions should not be established by law. They must be determined by the President and the Secretary of Defense as a result of constant study and analysis by a General Staff headed by a Chief of Staff.

Mr. WEISL. Is there anything I have not asked about, General, which you would like to comment on to the committee?

General SPAATZ. Well, I would just like to comment on one thing, and that is the idea that a General Staff in itself is a bad thing. And they base it on the fact that the Germans had a general staff, and by virtue of the general staff lost World War I and World War II.

I would say it differently than that. I would say that because of a general staff, a comparatively small nation almost defeated practically the rest of the world in World War I and World War II.

Mr. WEISL. Is there anything else I have failed to ask you about which you think would be of interest to this committee?

General SPAATZ. Well, the thinking of a military organization and practically any organization is the product of the thinking of the bril-

liant, industrious Indians. All they need from the Chief is the incentive and direction of thinking and a "yes" or "no" answer to their product.

In the present organization there are too many chiefs interfering or retarding decisions on the products which the Indians present.

Now as to the question as to whether a single Chief of Staff will become a man on horseback, a single Chief of Staff does not concentrate military power in the hands of one man but the responsibility for securing decisions.

There is still the Secretary of Defense, the President, the Congress, and the military heads of the services, with potent influence. Under a general staff system, it would be inconceivable that there had been a requirement for a certain number of ground divisions to be airlifted and the Air Force had not provided the airlift.

A general staff, with its knowledge of our existing weapons and future weapons as compared with those of a possible enemy, can recommend a proper balance between the procurement of today's hardware and the hardware of the future.

Mr. WEISL. I failed to ask you, General Spaatz, about your views on research and how that should be handled, in your opinion.

General SPAATZ. Well, of course, we have the basic research first. That has many ramifications and affects many things besides the military. We have the National Science Foundation for which, I believe, we are appropriating Federal money. I would say that the National Science Foundation is the proper place for basic research.

When it comes to taking advantage of the product of basic research, I am a great believer in the capacity of our industry to develop the equipment we need rather than the arsenal method.

Mr. WEISL. I think, Mr. Chairman, that is all I have to ask. My time is up.

PENTAGON NEWS RELEASE ON REORGANIZATION STUDY

Senator JOHNSON. Thank you, Counsel.

Before I propound some questions to General Spaatz, I should like to bring to the attention of the committee a proposed announcement which the Secretary of Defense has just sent to the committee, and which will be released at 12 noon. I shall read the release.

The Secretary of Defense McElroy announced today that the following individuals had accepted his request to assist him as consultants in studying the organization of the Defense Department and preparing any recommended changes: Hon. William C. Foster, former Deputy Secretary of Defense; Hon. Nelson A. Rockefeller, the Chairman of the President's Advisory Committee on Government Reorganization; Gen. Omar M. Bradley, former Chief of Staff of the Army; Admiral Radford, former Chairman of the Joint Chiefs of Staff; Gen. Nathan F. Twining, Chairman of the Joint Chiefs of Staff.

Secretary McElroy also announced the appointment of Hon. Charles A. Coolidge, former Assistant Secretary of Defense, as a full-time special assistant to help him in studying the Defense organization; the above-named individuals to meet regularly and frequently with the

Secretary of Defense over the next several weeks in a careful study of the Defense organization, and will review the various proposals that have been made affecting the Defense organization.

It is expected that the group will have interviews with many former civilian and military officials who have served in the Department of Defense as well as civilian and military officials presently serving at various levels in the Department of Defense and in the military departments.

The Secretary particularly intends to invite the views of all of his predecessors and all the former Deputy Secretaries of Defense. The Secretary plans to continue to discuss the Defense organization with the President with a view to making formal recommendations as soon as practicable.

It is expected that these studies and recommendations will include the Office of the Secretary of Defense, the organization and operation of the Joint Chiefs of Staff, and the military departments.

That concludes the release.

I know that the members of the committee will welcome this new step the Secretary is taking to get the advice of Mr. Foster who, I believe, served with the Gaither group, and Mr. Rockefeller, who served with the Rockefeller Commission, as well as that of the distinguished military men, to help him work out the proposals that he will recommend to the President, and the President, in turn, will recommend to us.

DECISION AS TO RELEASE OF GAITHER REPORT IMMINENT

I may say to the committee that during yesterday's meeting I again conferred with the representatives of the President about the possibility of making available to us some of the various proposals that had been made concerning the Defense Department, particularly the Gaither report.

I was told that a decision in connection with that matter would be reached shortly and that the chairman could expect to hear from the White House in the next day or so.

I will communicate that information on the Gaither report to the committee as soon as it is received.

In addition, purely by accident, the committee discovered an article in the Baltimore Sun regarding a very thorough study made by the office of research of Johns Hopkins University. This study was made in connection with our Nation's defenses and of course is a top secret study. It was filed, I believe, in August, and although we have been studying the matter since November, no one in the Defense Department called it to our attention.

Fortunately, as a result of the newspaper article we were able to determine the existence of such a study, and we demanded that it be given to us.

We received it only a day or so ago. We were informed it has been made available to the Navy and the Air Force as well as the Army. Counsel is now making careful study of it, and I hope that members of the committee may have an opportunity to review the recommendations of this distinguished group of researchers of Johns Hopkins University.

Senator BUSH. Mr. Chairman, how may we get a copy of this?

Senator JOHNSON. We only have one copy and the counsel kept it until late last evening in preparing questions to be used in connection with it. I will say if the Senator from Connecticut will talk to counsel, I am sure that he will make it available to him at some convenient time, because the report covers some questions that the Senator from Connecticut as well as other members of the committee are very concerned with and it is a very thorough report made by a top university. The far-reaching recommendations it makes should be brought to the attention of every member of this committee. I hope that either in an abridged form or in some form we may see the recommendations of the Gaither group, because I observed from this announcement that evidently those recommendations are going to be available to the people advising the Executive. I hope that the Congress could have the benefit of them. If it is top secret we will treat it that way.

I think maybe that the President is going to find some way that we can deal with that problem. It has been a particularly ticklish one and the precedents are against the release of NSC documents. We do not want to establish any new precedents, but at the same time we want all the information that is available. We do not want any of the information covered up, and I know no one wants to do that.

General Spaatz, if I may—

CONFERENCE ON GAITHER REPORT

Senator SYMINGTON. Mr. Chairman, before you proceed I would like to ask a couple of questions.

As you know, it has always been my position that the Gaither report should be desensitized and given to the American people. The excuse for not having done that is that it is an NSC paper. I believe that this report from Johns Hopkins is not an NSC paper and was made up for the Army and submitted to the other services.

Could I ask the Chair if there is any plan to ask that report be declassified and given to the people?

Senator JOHNSON. Counsel informs me that the material on which that report is based is highly classified material, and that he has reviewed the material contained in the report, the intelligence estimates and the references to the war plans, and other material, and that he does not feel that it would be practicable to declassify it. Although it is a top-secret document, it will be made available to individual members of the committee. If we can obtain more than the one copy, that will permit us to make it available to them at an earlier date than usual.

I regret very much that the Gaither report has not been made available to us. I understand the problems involved. I have had no less than 15 conversations about it with the White House.

I have suggested many alternatives; the White House has suggested some; but as we went down the road both of us found that our suggestions would not work out.

I am hoping that today or tomorrow the President may find some method of making available to this committee at least the recommendations and conclusions of the Gaither group.

Up to now we have received excellent cooperation from the Defense Department, although I deplore the fact that they could have saved

the committee weeks of work had they made available to us this Army study, about which we had to find out from a newspaper.

I hope the Secretary of Defense will take action to determine whether there are in the Defense Department any more studies which have a bearing on this subject, and if some are found that they will make them available to the committee.

Senator BUSH?

Senator BUSH. I would like to say I hope if they are available he will make them available to the new committee that he has just appointed, too, which, I would like to say, is a very good move on his part, a very constructive one, and from which I think this committee may itself eventually benefit by advice from them.

Senator JOHNSON. The Secretary indicates in his release that this group—Mr. Foster, of course, was on the Gaither group—

Senator BUSH. I think that is very good.

Senator JOHNSON. He indicates that they will review the various proposals and recommendations that have been made, and I would assume that would include some of the important ones in both of these studies, the Johns Hopkins study and the Gaither study.

Senator BUSH. I certainly hope they will.

Senator JOHNSON. I do not want those fine studies that the taxpayers are paying for and that these people have spent months in working up to go to waste. I do not think it is fair not to make them available to the Congress in order that we can carry out our duties.

I understand the problem on an NSC document, but we must find some way to get the recommendations and conclusions of those men without subpoenaing them and calling them up here and asking them to give us their opinion.

We do not want to do that.

Senator SYMINGTON. Mr. Chairman, I have read a small portion of the Army report and, based on the way papers are now being declassified by the Department of Defense, I think there are parts of that report which can be declassified.

I am getting more and more worried about these reports which are never declassified but nevertheless become public record through leaks.

Senator JOHNSON. Certainly, I do not want this committee to be a party to any of the leaks.

Senator SYMINGTON. Neither do I.

INTERESTED IN ADVISING THE AMERICAN PUBLIC

Senator JOHNSON. I will say to the Senator from Missouri I am sure he does not and I do not want to imply that he does.

We will pursue the matter further and if this information can be declassified we will ask that be done. We are all anxious to give the public as much information as we can without assisting the enemy.

Counsel is of the opinion that most of the information is of such a nature that it should not be declassified, and we will have to leave that for the present up to the Secretary of Defense.

Senator SYMINGTON. I don't want to get into any arguments with the counsel, but I think we ought to review this.

Some of the things I saw in the report are very disturbing and I think ought to be made a matter of record to the people.

If the people are not being told what the danger is then they are not going to do what is necessary to meet it.

Senator JOHNSON. The committee is doing all that it can prudently and wisely do to inform the people of the opinions of the outstanding authorities in this country, and we are going to continue to do so.

I might announce that we have hearings scheduled through Thursday. We plan to conclude this series of hearings on Thursday with the appearance of Gen. Lucius Clay. We do expect to have regular hearings each few weeks and call upon the Defense Department to make progress reports to us on its accomplishments and achievements in connection with the recommendations that have been made to this committee and that will be made by this committee.

We hope, however, to conclude the hearings, this particular series of them, on Thursday, and then divide our staff into some task forces and ask the Department to make regular periodic reports to us in open hearings.

Now, General Spaatz, if I may, I have a few brief questions I would like to ask you:

General, have the new weapons systems changed your thinking about military organizations?

General SPAATZ. They have changed them somewhat.

However, my basic idea of a military organization has not changed much since I have been in the Pentagon.

SINGLE CHIEF SEEN AS BRINGING "END TO ARGUMENT"

Senator JOHNSON. Precisely what would be desirable about giving a single military officer the power of the Joint Chiefs to make decisions?

General SPAATZ. There would be an individual responsible to the Secretary of Defense for bringing up to him a solution to the problem, for his review; instead of a committee. There would be individual responsibility.

The single Chief, in reaching his decision, would be aided by officers of all the services, would have the benefit of their thinking, but he would bring an end to argument and reach a firm decision to present to the Secretary of Defense or the President.

This is difficult under a committee arrangement.

A committee is not organized for quick, decisive action.

Senator JOHNSON. So, in your opinion it would change the results in terms of really speeding up the decision?

General SPAATZ. In speeding up the decision and have the decision such that the money was being spent for what was necessary and essential. Not distributed among the services based on giving each service what they thought they needed to fight the other services' war.

Senator JOHNSON. Is that what you think is being done now?

General SPAATZ. I think so.

Senator JOHNSON. The money is distributed to each service based on what each service thinks is necessary to fight the other services' war?

General SPAATZ. Then they argue trying to reach a compromise how the distribution is going to take place.

Senator JOHNSON. So it is your considered judgment, General, that a single Chief would result in greater efficiency in terms of planning

and in terms of procurement and in terms of deployment of forces?

General SPAATZ. I do; yes, sir.

Senator JOHNSON. General, do you think it would lead to a more realistic determination of roles and missions?

General SPAATZ. I think it would—the roles and missions would be clearly defined and the money would be spent properly so that each service would be better able to carry out its own mission, and for the dollars spent we would get much more national defense than we do under the present system.

BELIEVES PLAN WOULD AUGMENT CIVILIAN CONTROL

Senator JOHNSON. Would it add or detract from civilian control of the military?

General SPAATZ. Personally, I think it would add to military control. I think there is no question about who is responsible and overrides the military in this country. As I said before, it is the Secretary of Defense.

Now, added we have three civilian secretaries for the services, too, at this time.

Senator JOHNSON. Did I understand you correctly, the question was: Do you think it would add or detract from civilian control?

General SPAATZ. It would add to civilian control.

Senator JOHNSON. Fine. I thought that is what you intended. I am not sure that is what the record reveals.

Now, tell me why you think it would?

General SPAATZ. Under the present system you have an organization where the services have, I call them entrenched interests, who benefit from the business that the service gives, and who seem to take over control. The Air Force has its adherents, the Navy has its adherents, the Army has its adherents, and they go direct to the people and to the Congress.

Under the single Chief of Staff, the Secretary of Defense would have control of this and the military people would be under much closer control from him than they are at present.

Senator JOHNSON. Have you seen the Gaither report, General?

General SPAATZ. No, sir.

Senator JOHNSON. Have you read the summary of it in the newspapers?

General SPAATZ. I have read some of the things that have been said in the newspapers. I think from what I have read corresponds pretty much what I have read in the Rockefeller report and what the papers have been saying about that.

Senator JOHNSON. Have you read the Rockefeller report?

General SPAATZ. I have read that; yes, sir.

Senator JOHNSON. Would you care to give the committee your opinion of that report?

General SPAATZ. Well, I think it is a very excellent report except for 1 thing or 2 things. I don't think it comes out clearly for a chief of staff to the Secretary of Defense, and I believe that to form these task forces, as they now propose, is premature. I think you must have very careful study of that by a chief of staff and a general staff to reach the proper conclusion on that.

I can see considerable difficulty, if I read the report correctly, in transferring personnel from all the services to these task forces. The personnel problem would become terrific. For instance an officer of the Navy might be put into a task force and under the commander of that task force, out from under administrative control of his own service, then later on be relieved from that assignment and go back to the Navy. Some terrifically complicated personnel problems would arise.

I think you can form the task forces much simpler by leaving the personnel under the administrative control of their own services and transfer complete units by assigning or attaching to these task forces.

IN AGREEMENT GENERALLY WITH ROCKEFELLER REPORT

Senator JOHNSON. General, I think you are in accord with them.

General SPAATZ. Generally I am in accord with them.

Senator JOHNSON. General, the committee has this problem: We want to get a balanced opinion, a balanced judgment. We have many groups of thinkers to consider. First we have the scientists. We started the committee hearings with a distinguished scientist, Dr. Teller, and we have had Dr. Bush, Dr. Von Braun, and others.

Then we have had the educator, Dr. Chipman. Then we had the departmental people who are responsible for some of these decisions.

Each one of them has his own particular views and his own things he is interested in. We have called the businessmen who are making the planes and the missiles, and, of course, they have their interests. Some people might think they are selfish, like they think the Secretary of Defense's interests are selfish when he is defending what he has done or what he is going to do.

But you are in a little different category. You had a distinguished career, rendered a great service to your country. We have relied on you throughout the years and we still rely on you. You are not making any planes; you are not the head of some school that could take some extra students; you are not a scientist in the laboratory that would like to have its volume increased; you are retired. And you are a man with a wealth of experience in this field.

Do you think that we are doing enough?

FAULT IS WITH THE ORGANIZATION

General SPAATZ. In building up our military strength?

Senator JOHNSON. In our preparedness effort.

General SPAATZ. No; I don't. But I am not sure that under the present organization you can ever put enough money into the organization to be enough.

Senator JOHNSON. All right. I am not talking about money. Let us just start off counting what you would do. The first thing you would do is change the organization, isn't it?

General SPAATZ. Yes, sir.

Senator JOHNSON. All right. Now, assume you changed the organization, what do you think that would mean in terms of accelerating the program? Do you think it is necessary to accelerate our missile program, to make our SAC stronger, to disperse our Strategic Air Command, to make greater progress in cutting down lead time?

What are your views on that? Would you summarize them for the committee? First explain the organization.

General SPAATZ. First, explaining the organization so that you could get quick decisions on the things that are necessary to do.

The organization would analyze the hardware that we have as opposed to the hardware that the Russians have. They would analyze the development possibilities for new types of hardware, intercontinental ballistic missiles and more far-reaching things, spaceships, up to the control of space.

They would be sure that all the elements were properly taken care of. That we meet the submarine threat, for instance, of Russia, which is a terrific problem.

They would probably curtail activities of various services particularly where they are encroaching on the functions of other services, reducing wastage in that way.

I think, in general, they would produce an efficiency of operation that would give more defense, as I have said before, for the money spent.

Senator JOHNSON. Do you have any other suggestion you would like to give the committee?

General SPAATZ. Well, the only thing——

Senator JOHNSON. Or criticism.

General SPAATZ. The only thing is that, under democratic processes, of course, you have got to listen to the various ideas of organization. I have a firm belief in what I have told you. There are others that have a different belief, and under the democratic processes you have just got to sift those through your minds and reach what you think is a proper organization.

Senator JOHNSON. Have you followed the course of these hearings and the testimony generally?

General SPAATZ. Yes; I have been reading it.

Senator JOHNSON. Have you any suggestion or criticisms you want to make to the committee?

General SPAATZ. No, sir; from what I have read I think the committee is doing a most splendid job.

Senator JOHNSON. Senator Bush.

FACTOR OF REGENCY OF EXPERIENCE AS AFFECTING VALUE OF OPINION

Senator BUSH. General, I am one who is very much impressed with your views about this organization problem and I have been for quite a long time. I have read some of your articles on the subject, notably a recent one in Newsweek. You were very brief in your comments but very much to the point.

Last Saturday night I was talking to one of my friends high up in the Defense Department and he was cautioning me to be very careful about taking any position about reorganization of the Defense Department, and I assured him he need not worry about that so far as I was concerned but I said there are some people of experience with the Defense Department who feel that there is need for a reorganization and some people who have had contact with it at close range and been in it in one way or another, feel that way, that it surprises me that you are so concerned that something might happen.

Well, he said most of those people are out of date. They do not know what we are doing today. Now, I ask you, you have been out of active service for some years; I have forgotten how many. You have been close to the scene nevertheless and you undoubtedly have many friends in the service whom you see.

Do you feel that the committee is, that we should cast aside your judgment for lack of recent contact with the Department or the judgment of Mr. Foster or General Clay, Mr. Lovett perhaps or men like that, because they have not been in there recently, or are we justified in attaching considerable importance to the testimony from men such as those I have mentioned?

General SPAATZ. I believe we should have the most efficient organization we can have for the Defense Department. I think that is absolutely essential to meet the Russian threat.

I don't think that anything has happened since I left the Pentagon that would indicate to me that my ideas of the reorganization of the Defense Department should be changed one bit. I think the present situation speaks for itself in that respect. Otherwise you would not be holding these hearings here now.

Senator BUSH. General, how large a staff do you visualize should be available to the single Chief of Staff you visualize?

General SPAATZ. I would not visualize too large a staff to be permanently assigned to the general staff. If they get too many in there, they would tread on each other's toes.

I hesitate to say. It would be 150 or 200. In addition to the military personnel would be scientific experts and business experts.

Senator BUSH. I was going to ask that question specifically. Should civilian experts or scientists be members of the staff?

General SPAATZ. In my opinion, they should be.

REORGANIZATION WOULD PARE NUMBER OF PENTAGON OFFICERS

Senator BUSH. You would include that.

Would you feel then that the staffs of the individual services—the Army, Air Force, and Navy—might be reduced as a result of this reorganization?

General SPAATZ. I think the numbers of officers in the Pentagon, in the services, could be greatly reduced by this. At the present time they sit on committees watching each other and there are too many of them. I think that under proper organization you can greatly reduce the number of officers in the Pentagon.

Senator BUSH. I thank you very much, General.

I think you made a very convincing case.

Senator JOHNSON. Thank you very much.

Senator Symington.

Senator SYMINGTON. General, over a year ago in the airpower hearing you testified that you did not believe we were, and and I quote, "adequately prepared to meet the threat of the combination of Soviet air strength and submarine strength"?

Is it not true that since that time the Soviets have increased more than we have in both air and submarine strength?

General SPAATZ. I believe so; yes, sir.

Senator SYMINGTON. Does it not follow, therefore, that we are today in a dangerous situation from the standpoint of our national security?

General SPAATZ. I believe so.

Senator SYMINGTON. Do you know whether any airplane orders have been placed or any additional submarine orders have actually been placed since the 4th of October?

General SPAATZ. I would not know that.

Senator SYMINGTON. Well, to the best of my knowledge they have not.

Can you explain the policy of cutting back during this last year the strength presented to the Congress in 1957 as a minimum necessary to our security?

General SPAATZ. Can I explain?

Senator SYMINGTON. Yes.

General SPAATZ. I can't explain it.

Senator SYMINGTON. For example, let us take the Air Force, with which you are as well informed as anybody living today. In fiscal year 1957, the budget was \$17.7 billion; including a supplemental of \$910 million, the budget is \$17.7 in fiscal year 1958.

Now, the new budget for fiscal year 1959 is \$18 billion, which does not even show an increase sufficient to offset the depreciation of the dollar in value in that time. How can you explain that?

General SPAATZ. I can't explain that. But it is one of the examples of cutting the budget down and then raising it, an example of turning the faucet on and off which raises the cost of our hardware.

HIGH COST OF UNEVEN PROGRAMING

Senator SYMINGTON. I was interested in your testimony on that. In other words, you feel this constant programing and reprograming is costing us a great deal of money?

General SPAATZ. I can say more than a great deal.

Senator SYMINGTON. Suppose we had a different system entirely. Suppose we decided first what is the danger, and then how are we going to handle that danger and then organized to get it regardless of money. We probably would end up by spending a lot less money than before; would we not?

General SPAATZ. I think so. I think the first thing that is necessary is that the American people know what the threat is. When the American people know what the threat is, they will be willing to spend any amount of money to insure their security. But at the same time, I think they will demand, if it starts pressing them, meaning increased taxes or whatever it might mean, if it starts pressing them, they will at the same time demand the most efficient possible organization of the Department of Defense which is spending this money.

Senator SYMINGTON. General, you also testified that the IRBM in Soviet hands would not only be a weapon of great destruction but also a blackmail weapon. That was back in 1956. Do you still believe that?

General SPAATZ. I think that has become obvious. I think the Russians are using it as a blackmail weapon.

Senator SYMINGTON. What was your answer?

General SPAATZ. I say it has become obvious now that they are using it as a blackmail weapon.

Senator SYMINGTON. Do you believe the Soviets now have such a weapon in operational quantities?

General SPAATZ. I don't have any information as to that, but I would not be surprised.

Senator SYMINGTON. Now, accepting the fact that the Soviets are ahead in the IRBM—that has been our previous testimony—why do you think we have been outdistanced?

General SPAATZ. I didn't get the latter part of that?

GREAT EFFORT GOES INTO MAKING OF RUSSIAN MISSILES

Senator SYMINGTON. Why do you think we have been outdistanced?

General SPAATZ. By the Russians?

Senator SYMINGTON. Yes.

General SPAATZ. Because I think they put more effort and probably more efficient effort into the development of their missiles.

Senator SYMINGTON. There has been a great deal of talk about putting a lot more money into missiles. If we do, and we only raise our budget to the point that I just mentioned, then, of course, it is coming out of the Army, the Navy and the Air Force forces in being. In my opinion, that would not be done if we had a closer group with decision power in the Pentagon.

For example, it has been known for years, we have had it in open hearings, that today the Army cannot lift and properly support overseas a single division. I think it is very wrong that the airlift situation has been handled that way. I understand we have some 80 plus commitments overseas.

Shouldn't we be able to lift at least one division overseas and support it?

AIRLIFT INADEQUATE FOR BRUSH-FIRE WAR

General SPAATZ. Well, I personally think it is—for the United States to meet all the problems that come up, which includes the brush-war type of operation, which is also a very important one to take care of, we should have an airlift that takes care of a number of divisions, not one division.

Senator SYMINGTON. But we do not have the airlift to take care of one division. And we have stopped all development of airlift planes, so that we will not be able to defend ourselves or our allies in limited war. How can we justify that?

General SPAATZ. I don't know.

Senator SYMINGTON. Do you think it is wrong?

General SPAATZ. I think we have got to have our forces organized to meet the threat that exists.

Senator SYMINGTON. Is this the type and character of problem you think would be handled better than it is handled today if we had a single Chief?

General SPAATZ. I am sure of it.

Senator SYMINGTON. Do you believe a lot of the things we are building today are unnecessary in case of possible future war?

General SPAATZ. I think there are some; yes.

Senator SYMINGTON. Do you think there are some things we are not building today that are essential in possible future war?

General SPAATZ. I think that is true, too.

Senator SYMINGTON. Now, as soon as we start talking about saving money through reorganization of the Pentagon and stop thereby this unwarranted drain on the taxpayer, people start talking about the Prussian system. You commented on that to the effect that the Germans have done pretty well in the past. I don't think you brought up the additional point that they would probably have done even better than that with a general staff without the interference of the Kaiser in World War I and Hitler in World War II; is that not correct?

General SPAATZ. Yes. But the General Staff must be under political control; otherwise, it removes—it would become a military dictatorship, a thing that must be avoided.

Senator SYMINGTON. I understand that. I was only talking from the military standpoint.

General SPAATZ. Well, the Germans almost won it because of the efficiency of the German general staff.

WOULD NOT AFFECT INTEGRITY OF CIVILIAN CONTROL

Senator SYMINGTON. Any Chief of Staff, or any Chairman of the Joint Chiefs with a vote, comparable to the Rockefeller Committee's suggestion, would automatically report to a civilian, would he not?

General SPAATZ. Yes, sir.

Senator SYMINGTON. The Secretary of Defense.

General SPAATZ. That is right.

Senator SYMINGTON. And he could be hired or fired at will by that civilian; is that not correct?

General SPAATZ. That is correct.

Senator SYMINGTON. If we had a Chief of Staff, do you not think it would give more civilian control instead of less?

General SPAATZ. I think it would, and I think, in the case of this Chief of Staff, if he has an efficient General Staff under him, there is no necessity for this Chief of Staff staying in too long, because the staff action continues all the time. He could be put in for 2 years and removed, which would prevent any chance of a Chief of Staff staying in indefinitely and getting too much power in his hands. That could be handled by the length of service he is permitted to have.

Senator SYMINGTON. Then the Secretary of Defense reports to a civilian, does he not; the President of the United States?

General SPAATZ. That is correct.

Senator SYMINGTON. So, nobody seem to worry much about whether the No. 1 man would be "a man on the white horse," as the Prussian system they talk about, or the No. 2 man, but for some reason they go down to a No. 3 man, even though we have had a good many military Presidents in the past. They seem to think that reorganizing the Pentagon and saving billions a year is not a good idea because we might have a "man on a white horse" in a short time. Is that not the sum and substance of their argument?

General SPAATZ. We could have, possibly have, a man on horseback in the United States in case of an economic collapse, but, in my

opinion, in that case, the man on horseback would not be a military man.

As I said before, if we lack military strength, we might have a man on horseback, and he would be a military man, but he would be a Russian general.

Senator SYMINGTON. Field Marshal Montgomery said if the free world does not start organizing its defense on the basis of progress, instead of continuing to have them organized on the basis of tradition, the free world is going broke. Would you agree with that?

General SPAATZ. I certainly would; yes, sir.

ADEQUATE DEFENSE PLUS PRESENT ORGANIZATION EQUALS ECONOMIC
COLLAPSE

Senator SYMINGTON. Under the present setup of the Department of Defense, and recognizing the great advances that are being made by the Soviets in the military field, do you think we can adequately defend the United States?

General SPAATZ. I think, under the present setup, if we pour in enough money, you could probably build up the strength that would possibly take care of us, but my fear in that case would be that our economy would collapse.

Senator SYMINGTON. That is one of the premises of Montgomery's remark which I mentioned a minute ago.

General SPAATZ. Yes.

Senator SYMINGTON. So you believe, ultimately, we will have an economic bankruptcy unless the present situation in the Department of Defense is changed; is that correct?

General SPAATZ. That is correct.

Senator SYMINGTON. Thank you.

Senator BUSH (presiding). Thank you, Mr. Senator.

Without objection, the committee will take a recess until 2:30 this afternoon.

General, I am sure everybody is most grateful to you for being with us this morning. We very greatly appreciate the testimony you have given.

General SPAATZ. Thank you, Senator.

(Whereupon, at 12:40 p. m., the committee recessed until 2:30 p. m., at which time it convened in executive session.)

AFTERNOON SESSION

(Present: Senator Stennis, presiding.)

Senator STENNIS. The committee will come to order.

All right, gentlemen; stand up, please. You will be sworn, please.

Do you solemnly swear, each of you, that the testimony you give here in this hearing will be the truth, the whole truth, and nothing but the truth, so help you God?

Mr. DETWEILER. I do.

Mr. PERRY. I do.

(Statement regarding Chance Vought Aircraft, Inc., is as follows:)

Chance Vought Aircraft, Inc., a leader in the aircraft industry since 1917, last year marked its 40th anniversary as a designer and builder of high performance military aircraft.

The name of Chance Vought has been practically synonymous with the history of naval aviation. Since 1917, Vought engineers have developed 42 different models of aircraft and 2 production guided missiles.

In the comparatively new and tremendously complex field of guided missiles, the Chance Vought Regulus I—the Navy's first operational attack missile—has been serving with the fleet since 1955, giving the service, in combination with the submarine, a limited intercontinental capability today, well in advance of proving out of intercontinental ballistic missiles. Regulus II, an advanced, supersonic, long-range missile, is exceeding all expectations in test and demonstration programs.

The company's employment roster totals approximately 17,000 men and women. Its payroll is approximately \$1,750,000 a week.

The F8U-1 Crusader—the world's fastest Navy fighter—operates in an entirely new speed range far beyond the supersonic, and represents a new generation of Navy fighters. Its top speed is still cloaked by security but a Crusader was clocked at 1,015 miles an hour—more than 16 miles a minute—in setting a United States speed record in August 1956. First American fighter to exceed 1,000 miles an hour by official measurement, the Crusader is also the first 1,000-miles-an-hour-plus airplane to operate from aircraft carriers. Last month, Chance Vought and the Navy jointly received United States aviation's top award, the Collier Trophy, for the Crusader's development.

Also in December, Chance Vought received a Navy contract totaling approximately \$200 million for production of a new version of the Crusader, designated the F8U-2, and for continued production of the F8U-1 version.

Early this month, the company received a Navy contract totaling approximately \$100 million for continued development of the F8U-3, an advanced, all-weather jet fighter scheduled for flight test this summer. This new fighter will operate at more than twice the speed of sound and at altitudes which only a few years ago represented record heights.

In the missile field, Chance Vought's Regulus II is in the final stages of an accelerated test program at Edwards Air Force Base, Calif. With a range of more than 1,000 miles, it will arm both nuclear-powered and conventionally powered submarines now under construction. Regulus II is the advanced successor to the 500-mile-range Regulus I, the only operational attack missile ever fired from a United States submarine.

(Biographical sketches of Mr. Detweiler and Mr. Perry are as follows:)

Frederick O. Detweiler, president of Chance Vought Aircraft, Inc., Dallas, Tex., began his aircraft industry career with United Aircraft Corp.

Mr. Detweiler had served as general manager of the former Chance Vought Aircraft division, United Aircraft Corp., since January 1950, prior to becoming president of Chance Vought Aircraft, Inc., January 1, 1954.

A native of Granville, Ohio, where he was born August 6, 1911, Mr. Detweiler received his bachelor of arts degree in economics from Denison University in 1933.

During the summer and first semester of his sophomore year in college he worked in Hartford, Conn., for a company which manufactured heating pads, coffeemakers and razor stropers. His position with the firm, now the Silex Co., was a "handyman's job" incorporating such activities as running a punch press, cutting cloth, bending sheet metal and testing thermostats.

After graduation he became a factory timekeeper for Pratt & Whitney Aircraft division, United Aircraft Corp., in East Hartford, Conn. He held various accounting posts with the Pratt & Whitney division until September 1943, when he was transferred to Kansas City to become divisional accountant and assistant secretary of Pratt & Whitney Aircraft Corporation of Missouri. The Missouri installation grew to occupy more than 3 million square feet of space and it employed more than 25,000 people at its peak.

In 1945, Mr. Detweiler was appointed acting manager of the Missouri plant, supervising its postwar closing. In 1946, he became divisional controller for the Sikorsky Aircraft Division of United Aircraft, Bridgeport, Conn. He was appointed assistant general manager of the Chance Vought division in 1948 and became general manager in January 1950. In 1954, when Chance Vought became a separate corporation, he became president.

He is vice president of the Dallas County Community Chest, a director of the Texas Bank & Trust Co., the Dallas Power & Light Co., the Texas Law En-

forcement Foundation, Dallas County Chapter of the American Red Cross, Dallas Health Museum and the National Industrial Conference Board. He was appointed to the Texas Citizens Advisory Council for State Job Classification Study by Gov. Price Daniel in 1957. He is a member of the southwest advisory board, Liberty Mutual Insurance Co.; aviation committee, Dallas Chamber of Commerce; the University of Dallas advisory board; the Preston Hollow Presbyterian Church, the Northwood Club, the City Club and the Dallas Club.

Samuel Oliver Perry, Jr., chief engineer—missiles, for Chance Vought Aircraft, Inc., is a descendant of Commodore Matthew C. Perry, the naval officer who opened Japan to western civilization in 1853.

Formerly assistant chief engineer—missiles, Perry was born in New York City and grew up in Wilton and in Westport, Conn. He was graduated from Middlebury College, Middlebury, Vt., with a bachelor of arts degree in mathematics and physics in 1941 and joined Chance Vought initially as a mold loft employee.

In August 1943 he joined the Army Air Corps as a flying cadet and in March 1945 received his second lieutenant's commission and his wings as a multiengine pilot. Prior to leaving the service in 1946, he served as a project engineer in the aircraft laboratory at Wright-Patterson Air Force Base, Dayton, Ohio.

In October 1946 he rejoined Chance Vought's engineering department, this time in the pilotless aircraft (missile) section. He has been associated with the company's missile program since that time. He carried out a large portion of the analytical work on servomechanisms for the successful Regulus program.

In February 1950 he was transferred to California, where he served as assistant to the chief of missile design and later assumed responsibility for testing and flight operations at two bases.

Promoted to chief of missile design in 1954, he was named assistant chief engineer—missile projects in 1955, and chief engineer—missiles in 1957.

TESTIMONY OF F. O. DETWEILER, PRESIDENT, CHANCE VOUGHT AIRCRAFT, INC.; ACCOMPANIED BY S. O. PERRY, JR., CHIEF ENGINEER, MISSILES, CHANCE VOUGHT AIRCRAFT, INC.

Senator STENNIS. You have a statement prepared, do you not?

Mr. DETWEILER. Yes, I do, Mr. Chairman.

Senator STENNIS. All right, sir. Our custom is that a gentleman can put his statement in the record and then explain the high points of it; or, if he would rather, he may read his statement.

We are sorry, we want to put this biographical data in the record, Mr. Reporter. We want the biographical data placed here before his testimony.

We are sorry we could not get to you earlier, but you have already sensed what has been going on.

Would you like to read your statement, sir?

Mr. DETWEILER. With your permission.

Senator STENNIS. Let us have quiet, please. Those who are going to retire, please do so.

You may proceed.

Mr. DETWEILER. I would like first to express appreciation for the committee staying in session to hear us this afternoon.

I am honored and grateful for the opportunity to present this brief statement chiefly in support of previous testimony in the preceding 2 weeks of hearings. Toward the end of putting the Nation's state of preparedness in perspective, and further illuminating some of its facets, I offer the following:

The importance of developing reliable ballistic missiles—both intercontinental and intermediate range—is of the first order of magnitude to this country. So are the problems involved in the first order of magnitude.

Effectively, we have been working purposefully on the various ballistic-missile projects for no more than about 3 years. Our need has called up the brandnew technologies used in developing components, engines and fuel, guidance devices, new materials, and testing techniques unfamiliar a short time ago. In my opinion, the net of our progress to date is considerable and admirable.

THERE ARE MANY ASPECTS TO THE MISSILE PROJECT

However, there is still an apparent gap to be bridged to the point where these missile projects have produced dependable hardware, launching sites and ships, trained operational crews, ground support equipment, maintenance procedures and facilities, so that the entire missile systems are shaken down and can be counted reliably in our inventory.

The length of the gap varies somewhat, no doubt, with each particular project. From all that I have heard, it appears that the gaps are expected to be bridged in from 1 to 3 years from this point.

I have also heard that this estimate of the overall ballistic missile operational capability must be considered optimistic. I have no basis for judging this estimate accurately, but the future will. My own feeling is that the job will take longer than expected.

To paraphrase General Schriever's remarks at a press interview last Sunday—

when a new model automobile is produced, there is no concern by the producer as to the availability of highways for it to run on, service stations to service it, licensed operators to run it, nor maintenance agencies to maintain it.

With a new missile system, the situation is far different. We have a great deal of work to do and problems to solve and time to consume before we can operate at will the new missiles which our ingenuity and science have devised.

My point is that we must be prepared for difficulties ahead in the tremendous and experimental task of developing these complex ballistic weapons systems to the point where they can be used in service.

We must maintain our progress in other weapons system areas—in which areas progress has also been considerable in the past 3 years. We should not forget that if trouble comes, we must do the best we can with what we have. We need to maintain operational readiness, depth, and logistic support of today's weapons.

We also need to continue to exploit the improvements available in today's weapon systems, until we are truly ready to replace them with something better, and which are available in sufficient depth, in the hands of trained crews, and supported with all of the equipment and facilities required to make them workable on short notice.

I would fear an attitude of overdependence on any new weapons system, if that overdependence resulted, inadvertently or otherwise, in demobilizing the best existing weapons prematurely. I don't believe the first users of gunpowder let their spears get rusty.

I do hope we do not become overoptimistic, timewise, about our

coming new generation of ballistic weapons. It could hurt our national security.

PLEA FOR LONG-RANGE FUNDING

That there may be a temptation to become prematurely reliant on ballistic missiles in our planning makes my second point very important. We in industry do need clarity of leadership from the Department of Defense, in these times, with directions pointed as far ahead as possible.

Annual funding and contracting does not permit the most effective "development to production to operations" cycle on long-lead-time projects. For example, funding restrictions resulted in one of our missile contracts being received without authorization for a static test program or for support equipment. Authorization for these was deferred until the next fiscal year.

You have no doubt already heard that it would speed these projects up if contractors would be given less restrictive authorizations. I believe that the Congress could help here very definitely.

From our experience, the essential operations support has the hardest sledding budgetwise. Annual budget ceilings frequently provide engineering, test, and fabrication of the principal hardware, but budget stringencies almost always hamper the service's operating and testing manpower, training, technician's pay (military and civilian), fuel allowances, spare parts, and other supporting services vital to operational readiness.

Budget recognition for all these vital elements is required, and they must be protected from budget whittling each July 1. I suggest that the services be permitted 3-year contract authorizations for major weapon-system programs.

Another area in which better support by the Department of Defense would help is that of coordinated administration support across organization units. In amplification—once the Department orders missile hardware, close coordination is required for auxiliary services such as training and testing, and for auxiliary support such as facilities which are separately contracted for.

I believe that some of this administration is made more difficult by the dismaying degree of superauthority of Defense Department officials over the service which is managing the procurement.

In my opinion, one of the best managing jobs done by the Government recently, outside of the prosecution of World War II, was the job of handling contract terminations at the close of that war. A really staggering task of administration was well done, expeditiously and with good control—minor exceptions notwithstanding.

TECHNICAL PROBLEMS COMPLICATED BY LACK OF DECENTRALIZED AUTHORITY

I believe the secret of the successful administration of this job was the decentralization of authority and responsibility then utilized by the contracting services. It appears to me that, from the point of view of the contractors dealing with the separate services, we have now moved a long way in the opposite direction of decentralization. Whether or not we really have saved any appreciable amounts of contract money or time in doing so is open to question.

The technical and operating problems in bringing our ballistic missile weapons systems into being quickly are big enough by themselves. I hope that we can remove any foreseeable problems of administration.

The services need adequate budget freedom and administration authority to provide capable manpower, training, facilities, and logistic support. Without these we shall find ourselves boring impressive and expensive holes in the sky at the test ranges, but without a true military capability in being.

With proper clarification of what is needed, the budgets provided and authority and responsibility distributed properly, I am confident that the services and industry can do what is necessary in developing the new weapons expeditiously.

Thank you, Mr. Chairman, for the opportunity to submit this statement. I have with me Mr. S. O. Perry, Jr., Chief Engineer, Missiles. Mr. Perry and I are available if there are questions.

Senator STENNIS. All right, sir.

Mr. Counsel, do you have questions here?

Mr. WEISL. Yes, Mr. Chairman.

You have two Navy missiles. Will you describe their speed and their range?

Mr. DETWEILER. Yes, sir. I will within security limits.

The Regulus I, which has been operational with the Navy since 1953, has been subsonic at Mach. 95, range approximately 500 nautical miles; Regulus II which is not yet operational but undergoing evaluation has a speed of Mach 2 and a range of a thousand nautical miles still in its development process.

Mr. WEISL. When do you expect the Regulus II to become operational?

Mr. DETWEILER. Mr. Counsel, I am not sure whether this is classified or not, I believe it is. I would be happy to submit that in writing.

Mr. WEISL. Yes; very well. I am sorry.

Is the Regulus II operational from a land base?

Mr. DETWEILER. Not yet, sir.

Mr. WEISL. Could it be made operational?

Mr. DETWEILER. Very easily; yes. I would like to interpose that it is a very difficult job to develop a missile such as this for submarine installation.

When you have accomplished that you can count on launching it from most any base.

Mr. WEISL. Is the present planning in your opinion adequate for your Regulus II missile?

Mr. DETWEILER. I would like to answer that generally and if more detail is required again submit it in writing.

I would say not entirely. On two grounds: First, I believe that the present plan is not the most urgent plan that could be devised to expedite further the operational point, and second, I believe that the planning for ship-launching facilities is restrictive.

REGULUS COULD BE LAUNCHED FROM AIRPLANE

Mr. WEISL. I see.

Is the Regulus II launchable from an airplane?

Mr. DETWEILER. From a limited type of airplane. For example, the B-52; yes, sir.

Mr. WEISL. And that would have a range of 1,000 nautical miles; is that correct?

Mr. DETWEILER. Depending upon the speed. It would not have 1,000 miles at its maximum speed. It could attain a thousand miles with a combination of subsonic and supersonic flight; yes, sir.

Mr. WEISL. And it carries a hydrogen warhead?

Mr. DETWEILER. Yes, sir.

Mr. WEISL. Will cruise missiles such as the Regulus II fulfill a valid military requirement after the ballistic missiles become operational?

Mr. DETWEILER. Yes, sir; I am quite sure it will.

As a matter of fact, Rear Adm. John E. Clark, in the Office of Chief of Naval Operations, has said so.

It is unlike the ballistic missile in that it is versatile as to flight path. I think we all understand that the ballistic missile is started and then committed to a trajectory, whereas the aerodynamic cruise missile has a choice of altitudes and flight paths available to it.

Also, I believe that the cruise missile is capable of significantly more accurate guidance which permits its use in pinpoint target areas.

Mr. WEISL. Has the Regulus II been tested?

Mr. DETWEILER. Yes, sir. I am going to ask Mr. Perry to tell a number of flight tests.

Mr. PERRY. I believe that is cleared. We have had 23 flight tests to date.

Mr. WEISL. Have those tests been successful?

Mr. PERRY. Yes, sir, very successful.

Mr. WEISL. Do you believe that within a reasonable time the Regulus II could become operational?

Mr. PERRY. Yes, sir.

Mr. WEISL. In your letter to us, Mr. Detweiler, you made certain recommendations or your company did, I don't know whether you did or not, but the man in charge of this program did, which I will put in the classified record.

Mr. DETWEILER. Fine.

Mr. WEISL. If there is no objection from the chairman.

Senator STENNIS. Yes, sir.

Senator STENNIS. Proceed.

Mr. WEISL. Would you care to make any comments that have not been covered by my questions.

Mr. DETWEILER. I would like with your permission to make this comment: I mentioned in my little statement a point that has been mentioned previously, on the demand for leadership in the Defense Department, I think what I have in mind is that there presently is, it is not clear whether urgency is desired or whether restraint is desired.

We have at both times, at the same time, I should say, both a feeling that we should pursue these development projects as expeditiously as possible, and also at the same time very apparent restraints from budget limitations and tailored-down programs.

So I believe that the Defense Department needs to help us all in clarifying the urgency of the situation.

Mr. WEISL. In other words, you do not know whether they want you to comply with decision-making concurrences and processes rather than making the missile?

Mr. DETWEILER. Yes, sir.

Mr. WEISL. Is there anything else, Mr. Perry or Mr. Detweiler, that you think the committee ought to know or that ought to be put in the record?

LACK OF CERTAINTY AS TO REQUIREMENTS

Mr. PERRY. Also I might expand on Mr. Detweiler's statement in another facet.

From the technical end we are far from sure at any given time just what the requirements for the weapons are.

We have restricted requirements for a development per se to meet certain specifications, but the depth to which it is to be used, and the applications where it is to be used, are seldom, if ever, made clear or made known to any extent at all.

The number of ships we are designing to put Regulus missiles aboard varies not only from year to year but from week to week.

Ground-launched applications are considered then dropped. Air-launching applications are considered and then dropped. And the net result is confusion as to just what depth of weaponry we are trying to develop.

Mr. WEISL. Your company has been in business doing work for the Navy for over 40 years; has it not?

Mr. DETWEILER. Yes, sir.

Mr. WEISL. And despite that record of performance you don't know from day to day where you stand on these missiles?

Mr. PERRY. That is absolutely correct.

Mr. WEISL. They are changed and there are starts and stops constantly, and yet you put your company reputation behind a guaranty that you could get this missile produced in a reasonable time with a range of a thousand nautical miles, and a supersonic speed of mach 2.

Mr. PERRY. That is correct.

Mr. WEISL. With accuracy?

Mr. PERRY. That is correct.

Mr. WEISL. Mr. Chairman, those are all the questions I have.

Senator STENNIS. Mr. Weisl, I think this impressive statement here seems to be so modest and so true, too.

Turn here to page 2 of your statement, please, and let me ask you a question or two about the second paragraph which begins on page 2.

You say:

"From our experience, the essential operations support has the hardest sledding budget-wise," and then you elaborate on that. I understand it, you are restricted here and even in as small things as a fuel allowance and as spare parts is that what you are saying there?

Mr. DETWEILER. I say, Mr. Chairman, that frequently happens not only from the contractor's viewpoint but from the operating services' viewpoint.

Senator STENNIS. Yes. You do not have enough of spare parts and fuel to carry along these experiments?

Mr. DETWEILER. To carry on the experiments at the rate at which they need it.

I won't say we can't carry on any experiments.

Senator STENNIS. "Budget recognition," quoting further, "for all these vital elements, is required. They must be protected from budget whittling each July 1."

What does that mean?

Each July 1?

Mr. DETWEILER. I would like to offer an illustration:

Suppose that any service is programing a weapons system and finds that the annual increment of contract costs required to sustain the program is perhaps greater than its initial estimate.

In order to obtain the money for that program under a fixed ceiling, something else has to give, and more often than not, some of the services supporting activities are curtailed.

Senator STENNIS. All right.

Now that leads up to this last sentence:

"I suggest that the services be permitted 3-year contract authorizations for major weapon systems programs."

I have thought about that point or a similar point many times during these hearings.

Are you now on a 1-year contractual basis, is that right?

Mr. DETWEILER. Yes, sir.

Contracts are let annually based for the fiscal year, based on the fiscal year.

CONTRACTUAL SYSTEM A DELAYING FACTOR

Senator STENNIS. And nearly all of your programs, of course, run beyond that?

Mr. DETWEILER. Several years, that is right, which means successive contracting or amending of contracts each fiscal year.

Senator STENNIS. Of course you always come out all right or you still would not be doing business with the Government.

Mr. DETWEILER. Yes, sir; my point is that it is a slower process.

Senator STENNIS. Yes.

But you are entitled to know in the first place and then the fact that you know and the contracting agency of the Government knows, slows each of you down in your planning especially, does not it?

Mr. DETWEILER. Yes, sir; exactly.

Senator STENNIS. Your suggestion is now that on this research and development, at least that there be a minimum of a 3-year period in which things could be nailed down and made certain and then you operate on that basis, is that right?

Mr. DETWEILER. That is exactly right, sir; yes, sir.

Senator STENNIS. If you had this 3-year contractual basis that you mention would you be justified in giving the Government a better figure or better bid on a project?

Mr. DETWEILER. I am not sure that I can answer that, sir. I think it might work out that way if the contractor could thereby be assured of a continuous expeditious shortest line program to the end result.

Senator STENNIS. Yes. Well, even though you could not figure against wages and material increase, you could have the certainty of a continuing program and contract and that certainly is worth something to you in dollars and cents, is it not?

Mr. DETWEILER. Yes, sir, and I believe it is worth something to the services.

Senator STENNIS. All right.

Going back up to the preceding paragraph, you say this—next to the last sentence in that paragraph:

“You have no doubt already heard that would speed test projects up if contractors would be given less restrictive authorizations.”

Just what do you mean by that?

Mr. DETWEILER. I mean really to introduce the point which we have just discussed that if we had a longer range program and were not restricted to a short increment of it I think we could all do a better job.

Senator STENNIS. I thought that was the same thing but I wanted to be certain.

I value your testimony here and appreciate it for the committee as a whole, and it will be analyzed and presented to each of the members.

Mr. WEISL. If the chairman has no objection I would like to put into the classified record the letter which he sent to the committee.

Senator STENNIS. Yes, without objection that will be approved. Do either of you gentlemen have anything further?

Mr. DETWEILER. Thank you, sir.

Senator STENNIS. With the thanks of the subcommittee again and commending you too for your testimony, you are now excused.

Is there any other business to come before the committee—the committee will now take a recess until 10:30 o'clock tomorrow and meet in room 212, Senate Office Building, which is the Armed Services Committee room.

Secretary McElroy will be the witness.

The hearings will be closed—and Secretary Quarles will be a witness. The hearing will be closed.

There will be an afternoon session, if necessary.

(Whereupon, at 6 p. m., the committee was recessed, to reconvene at 10:30 a. m., Wednesday, January 22, 1958.)

INQUIRY INTO SATELLITE AND MISSILE PROGRAMS

THURSDAY, JANUARY 23, 1958

UNITED STATES SENATE,
PREPAREDNESS INVESTIGATING SUBCOMMITTEE
OF THE COMMITTEE ON ARMED SERVICES,
Washington, D. C.

The subcommittee met, pursuant to recess, at 10:30 a. m., in room 457, Senate Office Building, Senator Lyndon Johnson presiding.

Present: Senators Johnson (presiding), Stennis, Kefauver, and Saltonstall.

Also present: Senators Smith of Maine, Case, and Bush.

Edwin L. Weisl, chief counsel; Cyrus R. Vance, counsel; Gerald Siegel, associate counsel; Solis Horwitz, associate counsel; Daniel F. McGillicuddy, associate counsel, and Stuart P. French, associate counsel.

Senator JOHNSON. The committee will come to order.

The committee will have an executive session at 11:30. In the event we have not concluded with the testimony of the witness, we will recess the open session at 11:30 and resume at 2:30 this afternoon in the same room.

Our witness today comes to us at the suggestion of our distinguished friend from Missouri, Senator Symington, with the welcome and approval of each member of this committee.

Gen. Lucius Clay is now chairman of the board and chief executive officer of the Continental Can Co., and is one of America's most distinguished military men.

He is one of those men who are always found around, in a time of crisis for our country. If the committee would indulge me in this personal reference, there was no source that gave me more strength during the critical period in which I passed after my heart attack on July 2, 1955, than the communications and the words of comfort that General Clay personally gave me.

So I have particular reason to remember that.

General Clay performed services of tremendous value during World War II. He was Assistant Chief of Staff for Materiel, Services of Supply; Deputy Director for War Programs, and in 1945 was made deputy to General Eisenhower.

Following the end of the war he served as commander in chief of United States Forces in Europe and as military governor of the American Zone in Germany. He retired from the Army in 1949.

General Clay, I am particularly pleased to have you with us this morning. I know the committee will listen with interest to whatever you have to say. I ask unanimous consent of the committee to insert at this point in the record a brief biographical sketch of General Clay.

Without objection the insertion will be made.

General Clay, if you will come forward to the witness stand, it is customary for the committee that we administer the oath.

Will you raise your right hand?

Do you solemnly swear that the testimony you give this committee will be the truth, the whole truth?

General CLAY. I do.

Senator JOHNSON. Thank you, General Clay.

(Biographical sketch of General Clay follows:)

GEN. LUCIUS D. CLAY, CHAIRMAN OF THE BOARD AND CHIEF EXECUTIVE OFFICER OF CONTINENTAL CAN CO.

He was born April 23, 1897, in Marietta, Ga. He received a bachelor of science degree from the United States Military Academy in 1918.

He held many important military assignments until he was placed in charge of the defense airport program with the Civil Aeronautics Administration which position he held from 1940 to 1941.

Then he became Assistant Chief of Staff for Materiel, Services of Supply. He was appointed Deputy Director for War Programs in December 1944 and was made a deputy to General Eisenhower in 1945.

He became deputy military governor of the United States Zone in Germany in 1946 and was commander in chief of United States forces in Europe and military governor of the United States Zone in Germany from 1947 to 1949. He retired from the Army in May 1949 with the rank of general.

He is currently chairman of the board and chief executive officer of the Continental Can Co. He is a director of the Marine Midland Trust Corp., General Motors Financial Policy Committee, American Express Co., the Lehman Corp., Newmont Mining Corp., and the Metropolitan Life Insurance Co.

TESTIMONY OF GEN. LUCIUS D. CLAY, CHAIRMAN OF THE BOARD, CONTINENTAL CAN CO., FORMER MILITARY GOVERNOR OF THE UNITED STATES ZONE IN GERMANY

Senator JOHNSON. Do you have a prepared statement, General?

General CLAY. Senator, I do not have a prepared statement. I would like to say that I feel very privileged indeed to be here before this committee. I have followed its deliberations from the very first day, and I think the information which it has made available to the public and the work it has done for national defense has been the most outstanding work of its kind that I have ever seen.

It therefore is a very real privilege to have this opportunity to appear before the committee.

Senator JOHNSON. General Clay, I know each member of the committee, the majority and minority, deeply appreciate that evaluation from so competent a source.

Counsel, will you proceed with your examination of General Clay.

Mr. WEISL. General Clay, after your retirement from the United States Army, you became the head of one of our large business corporations, did you not?

General CLAY. Yes, sir.

Mr. WEISL. And you have also served as a director of many other large corporations.

General CLAY. Yes, sir.

Mr. WEISL. In addition to being the military governor of the United States Zone in Germany and commander in chief of the American Forces in Europe, you are also an engineer?

General CLAY. Yes, sir.

ACTIVE IN DEFENSE MATTERS SINCE RETIREMENT FROM THE ARMY

Mr. WEISL. Since your retirement from the Army, have you been exposed to the problems, military problems, particularly in military and procurement organizations, confronting this country?

General CLAY. I have, of course, kept in very close touch with many of my associates, and during the Korean war I came down with Mr. Wilson and helped him to set up the Office of War Mobilization. So for a period of about 4 months I was in very intimate touch with the Defense Establishment at that time.

Mr. WEISL. Did you also serve on the Rockefeller Brothers Committee?

General CLAY. I have been working on the Rockefeller Brothers Panel for the last 18 months, and of course helped to and participated in the report which they have recently published.

Mr. WEISL. Based upon your very wide experience, General, would you like to make some suggestions or recommendations to this committee concerning the organization of the Pentagon, so to speak?

General CLAY. Yes, sir.

As a matter of fact, my convictions with respect to what should have been done in the Defense Department really go back over the last 10 years, and I have felt that in the last 10 years, under the so-called unification of the services, we have actually had a widespread diffusion and dispersion of authority so that in fact we do not have such unification.

I feel that the various details of reorganizing the Defense Department are very complex and beyond the ability of anyone to even attempt to define, but there are certain basic principles that are very simple and from which I believe a satisfactory organization would develop.

The first of these is that I do not believe it is possible for the head of a large organization such as the Defense Department to really have the authority to do the job unless in the research, in the design and procurement of weapons, he has the power, after funds are appropriated, to transfer those funds in and between projects, reporting to the Congress after he has done so.

Until and unless the Secretary of Defense has that authority, he is exercising a responsibility which he cannot truly exercise.

I think it is very fundamental that the Secretary of Defense be given much more authority than he now has to transfer funds between projects having to do with the research and development and procurement of weapons.

Secondly, I think there is a need for a clear-cut definition of responsibility within the Defense Department. For that reason, I would propose that the services be limited to procurement of men, weapons, and the training of the individual, and that the tactical organizations report to the Chairman of the Joint Chiefs of Staff, who would be in operational control.

LINES OF AUTHORITY GOING TO SECRETARY OF DEFENSE

Under this setup, the Secretary of Defense would have two very clearly divided departments reporting to him: On the one hand, the logistics, operated as at present through the three Secretaries; on the

other hand, the military organizations, operating under the Chairman of the Joint Chiefs of Staff.

I believe that he should have at his disposal also a third grouping, a scientific evaluation group, which would concern itself with the evaluation of the research work being done by the services currently, and in addition would be responsible for more fundamental and much longer range research.

With such an organization, the Secretary of Defense, in my opinion, would be in complete control of the situation; and in point of fact, civilian control, which is now so widely diffused and dispersed as to be almost nonexistent, would once again be exerted at the policy level where it could be and would be most effective.

If this is to be effective, it seems to me that the Chairman of the Joint Chiefs of Staff, now a nonvoting member, should be given the full authority for the recommendations and decisions which come from that body; and that the remaining members should be advisory only, and should have no voting power.

I believe that in the tense world in which we live today, there is not time for the military and strategic decisions and recommendations for this country to be made by a committee, and in point of fact the Joint Chiefs of Staff is just another committee.

Finally, and this is perhaps a little more drastic, it seems to me that the time has come when our senior officers should belong to the same service and wear the same uniform.

Senator SALTONSTALL. Would you say that again, please?

General CLAY. The time has come when our senior officers should belong to the same service and wear the same uniform. Now, there are and must be specialists, and provision can be made for those who are specialists to be promoted within their specialty. But no future commander is going to fight a war with the troops or the weapons of any one service. He is going to have to fight with all services, and the quicker we realize that our high command should be capable of combined command and should be considered as combined commanders, the quicker we are going to get fully effective use of our defense forces.

I believe that from these basic principles there would very quickly flow a very much more effective, harder hitting defense organization than we have ever had, and that now we have to have that kind of a defense organization because we cannot afford any other.

HAS NO FEAR THAT PLAN WILL BRING "MAN ON HORSEBACK"

Mr. WEISL. Are you finished, General?

General CLAY. Yes, sir.

Mr. WEISL. May I ask this question, General Clay: The argument is constantly made that if a single military officer becomes the principal adviser to the President and the Secretary of Defense, it will dilute the power of the civilian forces over the military forces.

Do you agree with that oft-repeated argument?

General CLAY. I am convinced that in the multiplicity of people reporting to the Secretary of Defense, he has nowhere nearly the control that the civilian head of our Defense Department should have,

and that with a single person or a Chairman with the complete authority of the Joint Chiefs of Staff reporting directly to him, he will have a far more positive control of our military policy than he now has.

I have no worries whatsoever about that man becoming a man on horseback. In point of fact, I would rather take my chances even if that was a danger, than have some man on horseback ride in from somewhere else.

I think we are at the point now in our national defense where we have got to have the best. I do not believe you can have the best with three people reporting with conflicting viewpoints to the Secretary of Defense or to the President, and hope to have a Secretary of Defense and President who can resolve those differences while he is still attending to his other duties.

Mr. WEISL. In other words, General, you believe that under such a plan, civilian control would be greater and more effective than it is today?

General CLAY. I am positive that it would.

Mr. WEISL. I was interested, and I am sure the committee was, to note that you referred to the Joint Chiefs as "another committee." We have been told constantly, over and over again, that one of our troubles is so many committees, so many layers of committees.

Would you care to expand on that a little, General Clay?

General CLAY. Well, of course, the Joint Chiefs of Staff have the right to vote, and each member thereof, no matter how big a man he may be, goes there with the ringing in his ears of the views of his associates and subordinates; and if he gives in, when he comes back the looks on their faces make him feel that he has let them down.

In addition, they must depend upon the committees which they themselves have set up, which are composed of representatives of the several services, and each of these representatives has an instructed point of view from his own Chief of service. And if he compromises in any major way, he faces the very serious risk that when he goes back to his own service he will not be very welcome.

UNIFIED COMMAND SEEN AS VEHICLE FOR TRUE EXPRESSION OF VIEW

If, in point of fact, your senior commanders were in the combined arms, in the armed services of the United States, these brilliant young men that form the staff of the Joint Chiefs of Staff, knowing that their ultimate career was in the armed services of the United States, would, in my opinion, be much more capable of expressing their real thoughts and of working and developing a much more harmonious relationship and better solutions than they do now.

Mr. WEISL. Another argument that has been made over and over again, General Clay, is that Germany lost two wars because it had a single chief of staff.

Would you care to comment on that oft-repeated argument?

General CLAY. I would say that Germany lost two wars after greatly superior forces had been massed to destroy Germany, and that the achievements in the military sense prior to the overwhelming strength in which she was conquered by combined countries of far greater strength than she was, was quite a tribute to the successful operations of a single chief of staff from the military viewpoint.

Now as to whether or not the single chief of staff played an important role in making Germany a militaristic nation, I think it is moot and subject to very careful examination.

In point of fact, the German general staff was not really anxious to go to war when Hitler started his last war; but in the point of efficiency of operations, there is no question but that the German General Staff did prove that the single concept of staff was the most efficient from a military operations viewpoint.

Mr. WEISL. You have testified that modern weapons technology crosses service lines, and, therefore, that the military should be organized on a task-force basis.

Is my understanding of your testimony correct in that respect?

General CLAY. Not quite that, Mr. Weisl.

I believe very much that we should maintain in readiness for instant movement a combined task force with all of the transportation equipment that is needed so that if limited war did develop anywhere, we would move in so fast and with so great a force that it could be nipped in the bud before it became serious.

But beyond that, I thoroughly believe that all tactical units of all services should at all times be serving in a combined command under a combined commander and under a combined staff so that they begin at the very early stages of their training to learn to live and work together.

I think that that would do more to improve our overall efficiency and to eliminate the so-called rivalries between the services and anything else that could be done.

AUTHORITY TO TRANSFER FUNDS WOULD PROVIDE NEEDED AUTHORITY

Mr. WEISL. You have testified that the Secretary of Defense under the statute has insufficient power to exercise the authority he ought to exercise.

Would you care to elaborate on that and make some recommendations as to how that situation might be corrected?

General CLAY. Basically I think that authority goes with money, and a Secretary of Defense who has practically no control over the moneys made available to the Army, Navy and Air Forces has no authority.

I do not think you need any other authority than to give him the ability to transfer funds between the services for the procurement of weapons and for research and development.

That would give him all the authority he needs to do his job. He would become the boss immediately.

Mr. WEISL. He does not have that authority now?

General CLAY. He does not have that authority now.

Mr. WEISL. Would you care to comment on the control by statute of roles and missions of the services?

General CLAY. If you had combined commands and combined commanders and a chairman of the Joint Chiefs of Staff with full operational responsibility, he is far more concerned that he has missile teams, airplanes, ships and troops than he is to what service they belong, and the actual assignment of roles and missions under such an organization would, in my opinion, be very simple, but it would also be flexible in developing.

I do not think that you can define roles and missions accurately and that you cannot have them endure over any longer period of time with all of the modern technology, changes in weapons and in transportation that comes about almost constantly today.

Therefore, I would leave great authority and discretion in the Chairman of the Joint Chiefs of Staff in assigning roles and missions, and particularly those affecting not only the procurement but the use of new weapons.

If I were a combined commander, I assure you I would not care who was operating the missiles that I needed, as long as there was someone operating those missiles.

PROPER ORGANIZATION OF PENTAGON WOULD ELIMINATE WASTE

Mr. WEISL. Do you believe, General Clay, that the plan that you suggest would result in the elimination of waste because there would not be the competition by each service for each weapon?

General CLAY. Well, it would result in the elimination of some waste I would hope in a lot of Assistant Secretaries. I don't know whether you would call that waste in the strict sense of the word, but I think in the multiplicity of direction which you have in the Defense Department now in the many layers, you have the greatest waste, and as you simplify the organization and narrow down the responsibilities and the authorities, the people in charge are going to find where the waste is occurring and take the steps to correct it.

In my opinion, organization, proper organization, will do more to eliminate waste in the Defense Department than anything else.

Mr. WEISL. Many of the witnesses have testified to various plans for changing the method of using research.

Some have testified that basic research should be taken out of the military and put in the hands of a separate agency such as the National Science Foundation.

Would you care to comment on the question of what to do with research, basic and/or applied?

General CLAY. I feel very strongly that no matter what research may be undertaken, outside of the Defense Department, if the Secretary of Defense is to be held responsible for our national security, then indeed he must have within his control the necessary research facilities.

I do not believe that the services, pressed as they are with current problems, should undertake anything by applied research. The fundamental and more long-range research should be a part of the office of the Secretary of Defense, and he should have the proper scientific personnel, and above all, the funds and authority to enter into such contracts as might be necessary for that type and kind of research.

Mr. WEISL. One of the witnesses testified that the Chairman of the Joint Chiefs should be eliminated and that the Joint Chiefs themselves should rotate the Chairmanship and report directly to the President on plans and strategy and procurement.

Would you care to comment on that testimony?

General CLAY. It is bad enough to have a committee and to have a committee in which everybody scratches everybody else's back in turn would be about the poorest form of committee. I would not think that would be the kind of committee to take seriously.

ROCKEFELLER PANEL RECOMMENDATIONS UNANIMOUS DESPITE DIVERSE
VIEWPOINTS

Mr. WEISL. One final question, general, because I see that my time is almost up:

In the study of this problem by the Rockefeller panel, they had the advice of a cross section of business leaders, military leaders, union leaders, economists, bankers, and so forth.

General CLAY. And educators and publishers.

Mr. WEISL. In fact, a representative from almost every walk of life in the United States.

General CLAY. I think a deliberate attempt was made to do just that, sir.

Mr. WEISL. And the study took almost a year and a half, as I understand it.

General CLAY. Correct.

Mr. WEISL. What you have recommended to this committee is based not only on your very wide and very experienced judgment both in the military and business field, but also on the study this panel made in over a year and a half.

General CLAY. And, Mr. Counsel, I would like to add that it was remarkable to me that such a difference, so many different viewpoints and such a cross section could agree unanimously on the conclusions of that report and it was a unanimous report.

Mr. WEISL. My time is up and I want to thank you for your testimony, and I consider it a great privilege to have you close these hearings just as Dr. Teller, one of the world's greatest scientists, opened these hearings.

General CLAY. Thank you, sir, very much.

Senator STENNIS. Senator Johnson, I call on you first as chairman.

Senator JOHNSON. General Clay, I want to thank you for your statement. I am pleased to observe that you feel that reorganization of the Defense Establishment is important and necessary.

General CLAY. Yes, sir.

Senator JOHNSON. I know you will be pleased to know that the Secretary told the committee yesterday that he expects to have conferences and studies in this regard and he hopes that he will be able to have some action by spring, say April or May, in time for this Congress to do something about it.

General CLAY. Yes, sir.

Senator JOHNSON. You agree that that is very desirable?

General CLAY. I agree, sir, and I would hope that it would be even sooner.

Senator JOHNSON. Fine. I have no further questions. And I want to congratulate you on coming here, and I want to again express my deep admiration to you and my gratitude for the service you rendered my country and my people.

Thank you, Senator Stennis.

Senator STENNIS. Thank you, Senator Johnson.

Senator SALTONSTALL?

Senator SALTONSTALL. General Clay, may I join with the others on this side of the aisle in congratulating you in saying that our first visit together was in Berlin.

Senator JOHNSON. I want to point out to Senator Saltonstall I am on this side just temporarily. [Laughter.]

Senator SALTONSTALL. Well, the obvious suggestion to that, Mr. Chairman, is that you should come over permanently. [Laughter.]

WOULD DISCRETIONARY AUTHORITY OVER FUNDS WEAKEN AUTHORITY OF CONGRESS?

I have one question that might lead into a couple of others.

You stated that money is authorized and that the Secretary of Defense should have more control over the money and more discretion.

Now, in this year's budget, the President has recommended that he be given \$2 billion transfer authority which, as I gather it, is 5 percent. He also has a discretionary fund, I think, of about \$500 million.

Last year it was 80 million and I think the President's recommendation is \$500 million although that figure I am not sure of.

Now, when you suggest giving more discretionary power, you realize I know, that you run right up against the authority of Congress, and the feeling of many Members of Congress that the responsibility of Congress is to decide where the money shall go and not to give too broad discretionary power.

Do you think that 5 percent is enough discretionary power, with the right of transfers and perhaps another 500 million?

General CLAY. Senator, I would like to answer that this way: In many of the fields in which money is appropriated for defense, I do not think the discretionary power is necessary at all.

But when you are getting into research, design and going into the production of new missiles, I just cannot conceive of the Secretary of Defense really having the authority to do the job unless the Congress is willing to give him the authority to transfer funds between the services reporting back to the Congress on what he has done.

If you were Secretary of Defense, and you thought that one missile project was better than another but all you could do by canceling one was to have the money stand still, you could not use it where you wanted to, on the other hand it might bring something up that would be worthwhile, the chances are that you would let it ride, you would not stop it and put the money where it would be more effective.

You could not put the money where it would be more effective, so you would not stop it.

We are in a fast-moving technology, one that is moving so rapidly that we can make a great many mistakes which can only be corrected by the man on the job, the man who is actually responsible.

If we had to run our own businesses under a budget where no matter what happened during the year we could not change the arrangement of those funds we would soon be in bankruptcy and the Secretary of Defense is pretty nearly in bankruptcy now.

CONGRESS WOULD BE CONSULTED UNDER GENERAL CLAY'S PLAN

Senator SALTONSTALL. In other words, then you would advise not putting any limit on the right of transfer but you would say that such a transfer should be reported to Congress after it had been done?

General CLAY. Promptly, and in point of fact, it could very well be discussed with the committees of Congress if Congress was in session, before it was done.

Senator SALTONSTALL. Before it was done?

General CLAY. Yes, sir. But if Congress were not in session it would have to be done after the fact.

Senator SALTONSTALL. And you realize, of course, as I know you do as you were in the Army at the time, that that limitation on the control of the Secretary of Defense in the original Unification Act was put on together with the roles and missions in order to get the act through, and those limitations would, of course, require congressional change.

General CLAY. Yes, sir, I do.

As a matter of fact, Senator, I did not think it would work then.

Senator SALTONSTALL. I didn't hear you.

General CLAY. I did not think it would work then. I felt that the limitations put on the Office of the Secretary of Defense setup a figurehead really, a man who was assumed to be responsible, but who really was not responsible because he was not given the tools to be responsible.

Senator SALTONSTALL. I agree with you, but I also was one of those who had to try to get something.

General CLAY. I know that. It was a compromise measure.

Senator SALTONSTALL. Mr. Chairman, I have no more questions.

Senator STENNIS. General Clay, I am tremendously impressed with your sweeping and penetrating comments and suggestions, too, in these most difficult fields.

I feel that your combined military experience and your business experience as well as your own fine reputation, lend strength to your opinions and your conclusions. I am not going to repeat all the points here now or try to further examine you except on one or two points, if I may, and that, for the sake of being certain just what you included in your recommendation here that the Secretary of Defense, as to these research funds would not only have control over those appropriated funds and directing the carrying out of their use but would have control over them as between services and as between different projects or undertakings in this field of research, is that right?

AUTHORITY WOULD BE CONFINED TO R AND D AND PROCUREMENT

General CLAY. In the field of research, development and procurement of weapons, yes, sir, not in other fields, but in the purchase, the design and the procurement of weapons, I would give him that authority, yes, sir.

Senator STENNIS. That is all the way down the line even down to the rifle?

General CLAY. Yes, sir.

Senator STENNIS. And that would be a permanent part of the military appropriations structure?

General CLAY. Yes, sir.

Senator STENNIS. That this money, in effect, then would be appropriated to him for his discretionary use within these fields.

General CLAY. No, sir, I would not change the method of appropriation between the services.

I would let the budget come up as it does now. But once the appropriations have been made and as circumstances change I would allow the Secretary of Defense to make the requisite changes in the way those moneys have been allotted to projects, to put them to where they could be better used.

Senator STENNIS. That is for research and development and procurement, you say?

General CLAY. Yes, sir.

Senator STENNIS. Of all weapons from the missile, we will say, down to the rifle?

General CLAY. Yes, sir.

Senator STENNIS. And you think in that way it will not only save money but will make the going concern more effective?

General CLAY. Very much more so, yes, sir.

Senator STENNIS. Just how would this military advice come up to him under a plan like that?

It would come through the services of course, but just through what channel?

General CLAY. Well, under my proposal, sir, he would have two channels. He would have the Chairman of the Joint Chiefs of Staff who would be his principal military adviser telling him what was needed and what the priorities should be in the weapons made available.

On the procurement side he would have his present advisers, the Secretaries of the Army, Navy, and Air Force with their Chiefs of Staff to advise him as to what the services could do in the way of procurement, and the lead factors and time in which they could deliver.

Finally, he would have in this scientific group a weapons evaluation group that would give him scientific advice as to the probable advantages of going into new, far-reaching production of different weapons.

From the combination, three relatively small groups reporting to him, I believe he would be in a position to make very intelligent and rapid decisions.

SECRETARY WOULD HAVE WIDE LATITUDE TO TRANSFER FUNDS

Senator STENNIS. And he would have the authority there when he decided that we have two missile programs within a certain area, when he decided that one will do the job as well or better and that the funds should be concentrated on that, he would have the authority to proceed.

I use that as an illustration.

General CLAY. Yes, sir, or he could move money from other parts. He might even take it out of airplane or ship construction at the moment to put into a missile which was of extreme importance, reporting back to the Congress why he had done so.

Senator STENNIS. If he wanted to augment one particular weapon, even in procurement, he would have the authority to take the funds if he deemed it best from some other weapon, and put it in procurement for the No. 1?

General CLAY. Yes, sir.

Senator STENNIS. And did you separate basic research from that plan, or just what did you say if anything?

General CLAY. Yes, sir.

Senator STENNIS. On your basic research?

General CLAY. I would take the basic research entirely away from the services and place it directly in the Office of the Secretary of Defense who would be given the appropriations direct for basic research, and within the group of scientists he assembled for that purpose, I would also establish a weapons evaluation group which would examine the proposed weapons of the future and report to him their views as to the feasibility and the desirability of all-out production of such weapons.

Senator STENNIS. One additional point you made a while ago, if I understood it correctly.

Under the present system should the Secretary cancel out a project, he still cannot use that money under our present system for another project that he might think very urgent; can he?

General CLAY. That is correct, sir.

Senator STENNIS. And you want to eliminate that?

General CLAY. Yes.

Senator STENNIS. That bottleneck or choke on his authority?

General CLAY. Yes, sir.

Senator STENNIS. One other question on your recommendations here with reference to the Joint Chiefs of Staff, the military organization. I believe you said that one reason for your conclusion on this was the tremendous advance of weapons overlapping from one service to the other.

It has gotten to where you could hardly classify many of these weapons as belonging to one of the services anyway.

That brings up a point. Will you express yourself on that?

WE MUST NOT OVERLOOK POTENTIAL DANGER OF PERIPHERAL WARS

General CLAY. I think that is very manifest. If I were running a combined command, I would want various and sundry types of missiles. I would not particularly care what service was running those missiles as long as they were available.

I think that if the services knew that missiles were going to be used in a combined arm, that they would not be anywhere nearly so concerned about who has the missile as they are now.

Each of them now thinks of the missile—I think this is perhaps an exaggeration—as their way to survival, that they must have the missile or they may disappear from this picture.

As a combined commander, I would be concerned only to have missiles to serve the purposes I needed, whoever was using those missiles.

Moreover, I think that we have got to remember, it seems to me, a very important thing. That we have to be ready to fight two different kinds of wars.

It seems to me inevitable that within a few years and for a long time thereafter, the best that we can hope for is for total all-out war military equality, and when there is military equality between ourselves and Russia, if they live true to past form, it seems to me almost certain that they are going to be probing every weak part around

the periphery of the free countries trying to create incidents and troubles, perhaps even limited war. I think there is far more likelihood of us having to go into such a war than there is in the all-out war. At least I am sure that there would be such efforts before we ever got to all-out war.

I feel very strongly that the only way that you could prevent such an incident from becoming very serious is to have the forces available in great size and with such mobility that you could move in anywhere in the world in that kind of a situation within a matter of hours, and in point of fact I am firmly convinced that if we had such forces in being, then the probing might not ever really take place.

Senator STENNIS. A very good statement, indeed.

My time is up and I thank you again for your splendid testimony.

Senator Smith?

Senator SMITH. I have not any questions, Mr. Chairman.

Senator STENNIS. Senator Case?

AUTHORITY TO TRANSFER FUNDS WOULD EXTEND TO SOME AREAS OF MILITARY CONSTRUCTION

Senator CASE. Mr. Chairman.

General Clay, your background is such that the members of the committee certainly appreciate any recommendations you can give. When the first draft of the supplemental military construction bill was submitted to the House a few days ago, my understanding is that the bill at that time called for a transfer clause with respect to a percentage of the total funds proposed for military construction authorizations, but subsequently I think that was changed, and the bill as it is now pending before this committee is the bill that was passed by the House.

Would you extend this transfer principle to the military construction authorization bill as well as to include it in procurement of weapons such as you have already described?

General CLAY. I certainly would insofar as missile bases and airports and construction as a part of our defense force program.

Now whether it would be necessary to do that for housing and that sort of thing I would doubt.

Senator CASE. Possibly also for warning systems?

General CLAY. Yes.

Senator CASE. Where the construction season affects the possibility of using—

General CLAY. Yes. I actually really consider that bases, airports, warning systems are a part of your weapons system.

Senator CASE. That is a question presently pending before us and I appreciate getting your observation.

General CLAY. Thank you.

Senator CASE. With respect to your statement that you anticipate a probing of the periphery by the Soviet Union when the military equality is more or less established in the strategic fields, how do you think limited wars could remain limited?

General CLAY. By getting there "fustest with the mostest." I am quoting a general whom I am sure Senator Johnson will remember very well, and that was his only military maxim, to get there first with the most.

Limited war will never get beyond being a limited war if we can move in sufficiently fast with sufficiently large forces to settle the war quickly.

Senator CASE. When you were our chief representative in the tripartite administration of postwar Germany, did you find that kind of a tendency, probing of soft spots, so to speak, in the administration of the Soviet representatives in the zones?

EXAMPLES OF EFFECTIVE DETERRENT POWER OF THIS COUNTRY

General CLAY. I think I can say the attempt to blockade Berlin was certainly a probing of a weak spot in our periphery. I am certain that Korea started out in the same way.

Now at that particular time they were very careful with their probing because we had military superiority for all-out war. With the presence of our Strategic Air Command with our atomic bombs, our evidence of willingness to meet force with force, as we did in Korea, the Russians regarded the probing as a little bit too dangerous, in my opinion, and they quit probing.

But the minute that we no longer have this great deterrent power, then I think we may expect the probing to start all over again.

Senator CASE. When the strength was in evidence they were inclined not to go so far?

General CLAY. Yes, sir.

Senator CASE. Thank you, Mr. Chairman.

Thank you, General Clay.

Senator STENNIS. Senator Bush.

Senator BUSH. Thank you, Mr. Chairman.

General—

Senator JOHNSON. I should like to announce, Senator Bush, if you will pardon me, we had expected to go into executive session at 11:30 because the Senate will meet at 12. Each Senator has 10 minutes and Senator Bush is the last one present. I should like the vice chairman, who is presiding, to announce that at the conclusion of Senator Bush's questioning we will go into executive session.

Senator STENNIS. You have heard the chairman's announcement.

Senator BUSH. I will not use up my full 10 minutes, I can assure you. I want to join in what Senator Stennis said particularly in complimenting you on the very clear and concise recommendations which you have made in connection with the reorganization of the Defense Department.

These I think are the most specific that we have had and therefore I think the most helpful.

You spoke of the recommendations in the so-called Rockefeller report about the general officer or the flag-rank officer, and these are becoming general officers of the Armed Forces.

This seemed like a small detail, but because of the great tradition in these services, it is one that we want to think about, to wit, what would these officers be called?

Would they be called admiral if they came from the Navy, or general, if they came from the Army, or is that something you have not thought about, sir?

General CLAY. Well, as an old general, to get this done, if you could satisfy everybody by calling them admirals, I would be very glad to see them called admirals.

Senator BUSH. I do not think that is a very good suggestion because I don't think it would satisfy everybody.

SUCCESS OF COMBINED COMMAND DEPENDS ON EXTENT SERVICES ARE
REPRESENTED

General CLAY. I think that is a problem but I don't think it is a real problem, Senator.

I think you will find a great many thinking people in the services that have felt for a long time that you do not get a combined commander by putting an admiral or a general from the Army or from the Air Force in command of the various forces from the several services.

As you give him a staff from all of the services, then he becomes a little bit more of a combined commander and is accepted more willingly.

In my opinion, if it were known that his whole service after he has reached senior rank, regardless of his past background is in the armed services as a whole, I believe that the morale of the services would increase tremendously.

Now you will always have in the services a great majority of its personnel who will be perfectly content to become specialists and to go up in the more limited ranks and promotions that accrue to the specialists, but your very able, ambitious and brilliant young officers who are looking for the ultimate in career, as they see that they can only reach that career in the top branches of the armed services of the United States, are going to become completely armed services-minded, and you are not going to have to have committees in which there is endless debate because no representative of a service can give in on his service position without endangering his career.

You will have very brilliant, able young men sitting around a table and coming up with answers that will be of extreme importance to us and to the forwarding of our defense program.

I am sure of that.

UNIFICATION RECOMMENDED AT END OF WORLD WAR II

Senator BUSH. Thank you, General.

Now at the end of World War II, in fact, I think in November of 1945, there was published a report, after hearings were held by a special committee appointed by the several Chiefs of Staff, each service being represented on that and the fourth member having been Col. Trubee Davidson.

Possibly you remember the report.

General CLAY. I do.

Senator BUSH. In that report they recommended a much stronger step toward unification.

In fact, as I read the report the other day they came pretty close to recommending in their recommendations the thoughts which you have expressed before the committee today.

Do you agree with that or do you recall the report?

General CLAY. I recall the report, and I agreed with it then, and I was sorry to see a compromise solution come up, but I would also like to add one thought there, sir.

That report was also written in an atmosphere in which we had the only bombers that could deliver atomic bombs and the only atomic bombs, and there was no real sense of urgency as far as national security is concerned.

The great emphasis in that report was the saving of money, to get national security at lower cost, but today we face a very, very different situation, a situation in which, while we still have a superiority in the military field, we are fast losing it, and I do not think that the conditions which lead to compromise then warrant any kind of a compromise now.

Senator BUSH. Thank you, sir.

That report made recommendations that the Chairman of the Joint Chiefs of Staff be designated as the principal military advisor to the President.

General CLAY. Yes.

Senator BUSH. And commander of the Armed Forces of the United States.

General CLAY. Yes.

Senator BUSH. Without fussing about the titles, do I take it that your testimony recommends that that be the case, so to speak?

General CLAY. Yes, sir; except that I would make him in that capacity reporting through the Secretary of Defense.

Senator BUSH. Obviously.

Well, that was also provided, I think in the 1949 report.

General CLAY. I don't think I would give him the designation of the commander of forces.

Senator BUSH. You would not agree with that particularly?

General CLAY. No, sir; I think the President is the commander of the forces.

Senator BUSH. But the effect of the recommendations which you suggest—

General CLAY. Exactly.

Senator BUSH. Would make the chairman of the Joint Chiefs the top military commander of the Armed Forces nevertheless, would it not?

General CLAY. Yes, sir.

Senator BUSH. With the power of decision at that level?

General CLAY. Yes, sir.

Senator BUSH. Subject to the Secretary of Defense and the President?

General CLAY. Absolutely.

SAVINGS UNDER PROPOSED REORGANIZATION WOULD NOT BE IMMEDIATELY REALIZED

Senator BUSH. You have emphasized that one of the purposes of your recommendations is to provide increased efficiency in the Department of Defense and also economy as well.

One of our problems here to meet the demand for increased expenditures is a very real problem, because we already have a very heavy budget without the increased recommendations which are likely to be made to the Congress or in the Congress.

Would you agree that if the kind of reorganization we made that you visualize that we might find right in the savings that could be made, the economies that could be made by this reorganization, a large part of the added funds that are under discussion, such as those for supplementary appropriation and those of increased funds in the budget for 1959?

General CLAY. I would doubt that, sir; but I would think if this reorganization were made that with the submission of the next budget after the organization were in effect you would have elimination of a great deal of waste and duplication.

Senator BUSH. In other words, you would go to the 1960 budget?

General CLAY. That is right.

Senator BUSH. Before visualizing too much in the way of savings?

General CLAY. Yes, sir.

Senator BUSH. Mr. Chairman, that finishes my questions. I thank you very much.

Senator JOHNSON. Thank you very much, General Clay.

The Chair wishes to express appreciation on behalf of the committee for your testimony. It has been enlightening and helpful and we are grateful to you for coming here. I am glad to have seen you again. I hope the next time you come to town you will drop in.

General CLAY. May I just say as an American citizen how happy I am you are fully recovered and presiding in this chair today.

Senator JOHNSON. Thank you, General.

The committee will go into executive session and following the executive session the Chair will as usual meet with the press and review what has taken place in executive session.

The open meeting is recessed.

(Whereupon, at 11:35 a. m., the committee was adjourned, to proceed in executive session.)

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